



424133



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Subject:
 Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Dear Mr. Saric:

On July 15, 2008 representatives of the United States Environmental Protection Agency (USEPA), Michigan Department of Environmental Quality (MDEQ), National Oceanic and Atmospheric Administration (NOAA), and Kalamazoo River Study Group (KRSG) met in Chicago, IL to discuss, among other topics, a proposed plan for analysis of frozen sediment cores collected in fall 2007 from Area 1 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site). KRSG originally submitted a work plan describing this effort to USEPA on June 10, 2008. At the July 15 meeting, the Agency representatives requested clarification of the basis for the selection of cores for polychlorinated biphenyl (PCB) analysis and more information on the process used to classify cores as fine or coarse sediment. After reviewing initial Agency comments, KRSG submitted a revised work plan to USEPA on August 21, 2008. MDEQ provided written comments on September 19, 2008 and USEPA provided a final version of comments in a letter dated October 15, 2008. These comments have been addressed in this revised work plan, which supersedes the August 21, 2008 version.

As outlined in the *Supplemental Remedial Investigation/Feasibility Study Work Plan – Morrow Dam to Plainwell* (ARCADIS BBL 2007a; Area 1 SRI/FS Work Plan), the list of sediment cores selected for laboratory analysis must be approved by USEPA. This revised letter work plan describes a core analysis plan for Area 1 of the Kalamazoo River.

Work Plan Objective

The objective of the efforts described in this work plan is to analyze selected samples from the cores collected in 2007 to provide additional information and document current PCB levels in Kalamazoo River sediments, which is identified as a main objective in the USEPA-approved Area 1 SRI/FS Work Plan (ARCADIS BBL 2007a).

SEDIMENTS

Date:
 November 17, 2008

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Analysis of selected cores will provide additional information on PCB spatial distribution and mass inventories to that existing based on prior sampling efforts.

Background

In fall of 2007, a total of 16 new transects in the Kalamazoo River were probed and cored as part of the Phase 1 investigation outlined in Sections 3.4.1.1 and 3.4.1.2 of the Area 1 SRI/FS Work Plan (ARCADIS BBL 2007a). Ten of these transects were located between the former Georgia-Pacific Corporation Kalamazoo Mill (Georgia-Pacific Mill) and the Crown Vantage Landfill, with the remaining six transects between the Plainwell No. 2 Dam and Mill Race Confluence. A total of 118 cores from this effort were photographed, classified as fine or coarse sediments (as described below), and are currently in frozen storage. Descriptions of the cores are provided in Table 1.

Between the former Georgia-Pacific Mill and the Crown Vantage Landfill, sediment probing and core collection was performed at eight locations along each of 10 transects. The Area 1 SRI/FS Work plan states that approximately 30 cores from this area (an average of three cores per transect) will be selected for laboratory analysis.

From the Plainwell No. 2 Dam area and the Mill Race confluence, sediment probing and core collection was performed at eight locations along each of six transects. The Area 1 SRI/FS Work Plan calls for approximately 18 cores to be analyzed from this area. All sediment probing data are summarized in Tables 1, 2, and 3 of this work plan.

For purposes of core selection for analysis, sediment type at each core location was classified as either coarse or fine. This classification was based on the physical description recorded in the field logs at the time of core collection, which are summarized in Table 3. These descriptions were recorded by observing sediment texture, color, and stratigraphy through the side of the Lexan core tube. Two ARCADIS scientists independently reviewed each core description, and classified cores on a 0 to 5 numeric system. These same individuals have performed classification of the vast majority of sediment samples previously collected at the Site. In this system, 0 represents rock and gravel, and 5 represents silts and organic matter. Cores were rated based on the sediment characteristics described in the field notes, and included any layers or banding present in the core. The two independent ratings were compared, and cores for which the two ratings did not agree were re-examined, and the scientists jointly assigned a number. Previous examination of this method indicates this rating is performed consistently and results in a good

separation of fine and coarse designations, with some overlap (Brown 1997)¹. Transitional cores (i.e., those containing a relatively even mixture of fine and coarse materials) typically fall in the overlap between fine and coarse designations, and the classification of these cores in the numeric system tends to have the most subjectivity. However, most cores can be clearly classified as fine or coarse, and the inherent subjectivity of transitional core classification does not greatly impact the validity and usefulness of the core classification system. Further use of the fine and coarse designations for sediments after analysis depends, in part, upon use objectives. The use objectives for these core classifications may incorporate an opportunity for reclassification of these samples based on a protocol to be developed jointly by KRSG and USEPA, as discussed at the July 15, 2008 meeting in Chicago.

The Area 1 SRI/FS Work Plan specifies that approximately 75 percent of cores selected for analysis will be from fine-grained sediments, with the remaining 25 percent from coarse sediments. During the meeting held July 15th in Chicago, USEPA and MDEQ emphasized that the goal of including approximately 75 percent fine sediment locations should not be interpreted as a minimum number of fine sediment samples and that if insufficient fine sediment locations were identified, that a reasonable number of fine sediment locations should be targeted even if it results in somewhat less than 75 percent of the total number of sample locations. Because relatively few probing locations were classified as fine-grained in Phase 1 activities, the proposed selection of cores (as outlined below) collected between the Georgia-Pacific Mill and the Crown Vantage Landfill results in 63 percent from fine-grained sediments and 37 percent from coarse-grained sediments, and 28 percent from fine-grained sediments and 72 percent from coarse-grained sediments from the Plainwell No. 2 Dam to the Mill Race Confluence.

Selection of Proposed Core Locations

Georgia-Pacific Mill to Crown Vantage Landfill

A total of 30 cores collected from this reach – 19 classified as fine-grained and 11 classified as coarse-grained – were selected for PCB analysis. Approximately three cores from most transects were selected for analysis in an effort to evenly distribute

¹ Brown, M. 1997. Letter from Mark P. Brown (Blasland, Bouck and Lee, Inc.) to Scott Cornelius (MDEQ) re: Kalamazoo Sediment Particle Size Analysis, Project #. 645.24.112. December 1, 1997. Letter is included here as Attachment 1.

cores throughout the reach. Table 4 summarizes the selected cores by river reach, and Table 5 lists the selected cores. Figures 1 and 2 show the locations and classifications of all cores collected during Phase 1 activities, and Figures 3 and 4 show the locations and classifications of cores selected for analysis.

Plainwell No. 2 Dam to Mill Race Confluence

In this reach, a total of 18 cores – approximately three from each transect – were selected for PCB analysis. All five cores described as fine-grained were selected (28 percent of the total); the other 13 were classified as coarse-grained sediments (72 percent). Table 6 displays a breakdown of the selected core locations by river reach, and Table 7 provides a summary of cores selected for analysis. Figure 5 shows the locations and classifications of all cores collected during Phase 1 activities, and Figure 6 shows the locations and classifications of cores selected for analysis.

It is possible that cores initially thought to be representative of fine or coarse sediments may reclassified upon visual inspection of the opened core using the Unified Soil Classification System (USCS). This could result in fewer samples being obtained from fine sediments than intended because all cores described as fine-grained sediments are currently targeted for analysis. If some of the selected fine sediment cores are reclassified upon inspection with USEPA and MDEQ oversight personnel, the available cores in storage will be reviewed to see if there are any suitable replacements and if so, those would be substituted in consultation with oversight personnel.

SEM/AVS and TCL/TAL Analysis

As specified in the Area 1 SRI/FS Work Plan, sediment samples from two cores from each reach (determined as approved by USEPA) will be submitted for laboratory analysis of Total Compound List/Total Analyte List (TCL/TAL) constituents, and the surficial interval from these cores will also be analyzed for simultaneously extracted metals/acid volatile sulfide (SEM/AVS). Fine-grained cores from locations KRT2-6, KRT9-8, KRT13-8, and KRT16-8 (core descriptions are provided in Table 1) are proposed for TCL/TAL and SEM/AVS analysis. These cores were selected from the upper and lower ends of each of the two main reaches in Area 1 to provide more extensive characterization. KRT16-8 was also selected to further examine the gray materials noted in this core (as presented in Table 1). Based upon texture data and sediment distribution along the transects, these core locations are believed to be most representative of fine-grained sediments present in this part of Area 1. Cores for TCL/TAL and SEM/AVS analysis are noted on Tables 5 and 7. If based on further

inspection, these cores are determined to not be representative of sediments in these reaches, alternate cores may be selected, in consultation with the Agencies, for SEM/AVS analyses.

All sediment cores will be processed and analyzed in accordance with the methods and protocols in the USEPA-approved Area 1 SRI/FS Work Plan and the Multi-Area Field Sampling Plan (ARCADIS BBL 2007b).

Schedule

Contingent on USEPA approval of this work plan and availability of USEPA oversight, ARCADIS is currently anticipating starting core sectioning activities on December 1, 2008. It is estimated that processing of these cores will take approximately five days.

Sincerely,

ARCADIS



Michael J. Erickson, P.E.
Associate Vice President

Copies:

Paul Bucholtz, MDEQ
Jeff Keiser, CH2M HILL
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Mark Brown, PhD, Georgia-Pacific LLC
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Enclosures:

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- Figure 6 – Sediment Samples to be Analyzed for Total PCBs – Upstream of Plainwell No. 2 Dam to Mill Race Confluence

Attachments

- Attachment 1 – 1997 Kalamazoo Sediment Particle Size Analysis Letter

References

ARCADIS BBL. 2007a. *Supplemental Remedial Investigation/Feasibility Study Work Plan – Morrow Dam to Plainwell*. February 2007.

ARCADIS BBL. 2007b. *Multi-Area Field Sampling Plan*. October 2007.

Brown. 1997. Letter from Mark P. Brown (BBL) to Scott Cornelius (MDEQ) re: Kalamazoo Sediment Particle Size Analysis. December 1, 1997.

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Tables

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
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Table 1 – Sediment Core/Probing Data - Kalamazoo River Transects

Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description	
KRT1	KRT1-1	0	2.8	0.80	0.45	Coarse	0 - 0.45	Gray Brown Fine to Medium Sand, Little Coarse Sand	
KRT1	KRT1-2	3.9	5.0	3.4	2.3	Coarse	0 - 1.3	Dark Gray Brown Fine to Medium Sand, Trace Organics	
							1.3 - 2.3	Dark Gray Brown Fine to Coarse Sand	
KRT1	KRT1-3	3.7	1.7	2.3	1.8	Coarse	0 - 0.10	Dark Gray Very Loose Silt	
							0.10 - 1.0	Dark Gray Brown Fine to Medium Sand	
							1.0 - 1.8	Dark Gray Brown Fine to Coarse Sand	
KRT1	KRT1-4	3.0	0.6	1.9	1.4	Coarse	0 - 1.4	Gray Brown Fine to Medium Sand, Little Fine to Medium Gravel, Trace Coarse Sand, Trace Silt	
KRT1	KRT1-5	2.1	2.7	2.9	1.8	Coarse	0 - 0.50	Gray Brown Fine to Medium Gravel, Trace Fine to Coarse Sand	
							0.50 - 1.8	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel	
KRT1	KRT1-6	3.2	1.8	2.0	1.7	Coarse	0 - 0.60	Gray Brown Fine Sand, Trace Silt	
							0.60 - 1.3	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine Gravel	
							1.3 - 1.7	Gray Brown Fine to Medium Gravel, Trace Light Gray Clay Like Material	
KRT1	KRT1-7	4.1	1.9	2.9	2.3	Coarse	0 - 2.1	Orange Brown Grading to Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine Gravel	
							2.1 - 2.3	Dark Gray Brown Fine to Coarse Sand, Little Fine to Medium Gravel	
KRT1	KRT1-8	2.5	0.0	2.9	2.7	Coarse	0 - 1.0	Light Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							1.0 - 1.1	Light Gray Brown Fine to Coarse Sand, Little Fine Gravel	
							1.1 - 1.7	Light Gray Brown Fine to Medium Sand	
							1.7 - 1.8	Brown Root (Wood)	
							1.8 - 2.7	Light Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel At Bottom	
KRT2	KRT2-1	0	3.5	3.0	2.1	Coarse	0 - 1.1	Dark Gray Brown Fine Sand, Little Silt	
							1.1 - 2.1	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
KRT2	KRT2-2	5.2	6.0	6.0	5.4	Coarse	0 - 4.1	Brown Grading to Dark Gray Fine to Medium Sand	
							4.1 - 5.2	Gray Fine Sand/Silt	
KRT2	KRT2-3	3.8	7.8	7.0	6.1	Coarse	0 - 3.6	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							3.6 - 5.0	Gray Brown Grading to Dark Gray Brown Fine Sand	
							5.0 - 6.1	Dark Gray Brown Fine Sand/Silt	
KRT2	KRT2-4	2.3	7.7	5.3	4.5	Coarse	0 - 2.5	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							2.5 - 3.3	Gray Brown Fine Sand/Silt	
							3.3 - 4.5	Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine Gravel, Trace Organics (Wood)	
KRT2	KRT2-5	1.3	6.2	4.3	3.5	Coarse	0 - 2.4	Gray Brown Fine to Medium Sand, Trace/Little Coarse Sand	
							2.4 - 3.5	Gray Fine Sand/Silt	
KRT2	KRT2-6	2.6	3.4	2.8	2.3	Fine	0 - 0.60	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							0.60 - 2.3	Gray Brown Fine Sand/Silt	

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KRT2	KRT2-7	3.2	1.4	1.1	0.90	Fine	0 - 0.70	Gray Brown Fine Sand/Silt	
							0.70 - 0.90	Gray Brown Fine to Medium Gravel, Trace Fine to Coarse Sand	
KRT2	KRT2-8	0	5.5	4.2	3.1	Fine	0 - 0.50	Dark Brown Fine Sand, Trace Silt	
							0.50 - 3.1	Dark Gray Brown Fine Sand/Silt	
KRT3	KRT3-1	0.75	1.0	1.2	1.1	Fine	0 - 0.90	Gray Brown Fine Sand/Silt	
							0.90 - 1.1	Fine to Medium Gravel, Trace Fine to Medium Sand	
KRT3	KRT3-2	3.6	4.6	3.6	2.9	Coarse	0 - 0.50	Dark Gray Brown Fine Sand, Little Silt	
							0.50 - 1.9	Gray Fine to Medium Sand, Little Coarse Sand	
							1.9 - 2.5	Gray Fine to Medium Sand, Little Coarse Sand, Little Silt	
KRT3	KRT3-3	5.3	2.7	2.4	2.0	Coarse	0 - 0.40	Brown Fine Sand/Silt	
							0.40 - 2.0	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace/Little Fine to Medium Gravel	
							0 - 0.80	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel 0.6-0.8 Ft	
KRT3	KRT3-5	8.2	1.5	1.5	1.2	Coarse	0 - 0.50	Gray Brown Fine to Medium Sand, Little Coarse Sand	
							0.50 - 1.0	Gray Brown Fine to Medium Gravel, Little Fine to Coarse Sand	
							1.0 - 1.2	Gray Brown Fine to Medium Sand	
KRT3	KRT3-6	6.3	1.3	0.80	0.50	Coarse	0 - 0.50	Gray Brown Fine to Coarse Sand, Little/Some Fine to Medium Gravel	
KRT3	KRT3-7	3.1	2.7	2.3	2.1	Coarse	0 - 0.50	Dark Brown Very Loose Fine Sand/Silt	
							0.50 - 2.1	Light Gray Fine to Medium Sand, Trace Coarse Sand	
							2.1 - 2.2	Light Gray Fine to Medium Sand Grading to Light Gray Fine to Coarse Sand, Little Fine to Medium Gravel At 1.9 ft	
KRT4	KRT4-1	0.45	3.7	3.2	2.8	Coarse	0 - 0.80	Dark Gray Brown Fine Sand/Silt	
							0.80 - 2.1	Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							2.1 - 2.8	Dark Gray Brown Fine to Coarse Sand Grading With Trace/Little Fine to Medium Gravel At ~ 2.5 ft	
KRT4	KRT4-2	1.9	7.1	6.0	4.5	Fine	0 - 0.50	Dark Brown Find Sand And Silt	
							0.50 - 2.6	Dark Gray Silt/Clay	
							2.6 - 3.3	Dark Gray Brown Fine to Medium Sand, Little Coarse Sand	
KRT4	KRT4-3	5.3	5.0	5.0	4.8	Coarse	0 - 0.80	Dark Gray Brown Fine Sand/Silt	
							0.80 - 2.3	Gray Brown Fine to Coarse Sand	
							2.3 - 3.6	Dark Gray Brown Fine Sand, Trace Silt	
							3.6 - 4.8	Brown Fine Sand	

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Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description
KRT4	KRT4-4	7.0	2.4	2.2	1.9	Coarse	0 - 0.10	Brown Fine Sand
							0.10 - 1.2	Gray Brown Fine to Coarse Sand, Little/Some Fine to Medium Gravel
							1.2 - 1.9	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel
KRT4	KRT4-5	8.2	1.3	1.3	1.3	Coarse	0 - 0.50	Brown Fine to Medium Sand, Little Coarse Sand
							0.50 - 1.3	Dark Gray Brown Fine to Coarse Sand, Little Fine to Medium Gravel
							0 - 0.050	Brown Loose Silt
KRT4	KRT4-6	3.7	3.5	3.5	3.4	Coarse	0.050 - 0.80	Gray Brown Fine to Medium Sand, Little Coarse Sand
							0.80 - 1.3	Brown Coarse Sand And Fine Gravel, Trace Fine to Medium Sand
							1.3 - 3.4	Dark Gray Fine to Medium Sand, Little Coarse Sand, Trace Fine Gravel
							0 - 0.30	Gray Brown Fine to Coarse Sand, Trace Fine Gravel
KRT4	KRT4-8	1.5	2.1	1.8	1.7	Coarse	0 - 0.30	Brown Fine to Medium Sand
							0.30 - 1.7	Light Gray Brown Fine to Medium Sand, Trace Coarse Sand
							0 - 1.1	Brown Fine Sand And Silt
KRT5	KRT5-1	0	4.5	3.0	2.0	Fine	1.1 - 2.0	Gray Brown Fine to Medium Sand, Trace Coarse Sand
							0 - 0.80	Brown Fine Sand/Silt
							0.80 - 2.2	Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel At 2.1-2.2 ft
KRT5	KRT5-3	5.6	5.7	4.9	4.1	Fine	0 - 1.2	Brown Loose Fine Sand And Silt
							1.2 - 3.7	Gray Fine Sand And Silt
							3.7 - 4.1	Gray Fine to Medium Sand, Trace Coarse Sand
KRT5	KRT5-4	8.9	4.1	3.2	2.7	Fine	0 - 0.80	Brown Fine to Medium Sand, Trace Organics
							0.80 - 2.7	Gray Fine Sand/Silt, Trace Organics
							0 - 0.60	Brown Fine to Medium Sand, Trace Coarse Sand
KRT5	KRT5-5	9.9	3.7	3.5	2.8	Coarse	0.60 - 1.4	Gray Fine Sand/Silt
							1.4 - 2.8	Gray Fine to Medium Sand, Little Coarse Sand
							0 - 0.50	Brown Fine to Coarse Sand
KRT5	KRT5-6	9.7	4.2	3.0	2.6	Coarse	0.50 - 1.3	Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand
							1.3 - 2.1	Gray Fine Sand/Silt
							2.1 - 2.6	Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand
							0 - 0.10	Brown Loose Silt, Trace Organics
							0.10 - 0.30	Brown Fine to Medium Sand, Little Coarse Sand
KRT5	KRT5-7	7.5	3.3	3.0	2.3	Coarse	0.30 - 1.1	Gray Brown Fine to Medium Sand, Trace Coarse Sand
							1.1 - 1.7	Gray Fine Sand/Silt, Trace Organics (Wood)
							1.7 - 2.3	Gray Brown Fine to Medium Sand
							0 - 0.50	Dark Brown Fine to Medium Sand, Trace Coarse Sand, Trace Organics
							0.50 - 1.2	Orange Brown Fine to Medium Sand, Trace Coarse Sand, Trace Gravel/Cobble (Tube Bottom Bent)
KRT5	KRT5-8	1.7	3.0	1.5	1.2	Coarse	0 - 0.50	Dark Brown Fine to Medium Sand, Trace Coarse Sand, Trace Organics
							0.50 - 1.2	Orange Brown Fine to Medium Sand, Trace Coarse Sand, Trace Gravel/Cobble (Tube Bottom Bent)

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Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description	
KRT6	KRT6-1	1.7	3.2	2.8	2.4	Coarse	0 - 0.50	Dark Gray Brown Fine Sand, Trace Silt	
							0.50 - 2.4	Gray Fine to Medium Sand, Trace Coarse Sand, Trace Silt	
KRT6	KRT6-2	5.0	5.5	4.5	2.9	Fine	0 - 1.8	Dark Gray Brown Fine Sand And Silt, Trace Organics	
							1.8 - 2.9	Gray Fine to Coarse Sand, Trace Fine to Medium Gravel	
KRT6	KRT6-3	7.3	4.7	3.8	3.2	Coarse	0 - 0.50	Dark Gray Brown, Fine Sand, Trace Silt, Trace Organics	
							0.50 - 3.2	Gray Brown, Fine to Medium Sand, Little Coarse Sand	
KRT6	KRT6-4	7.0	4.0	3.5	2.9	Coarse	0 - 2.3	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
							2.3 - 2.6	Gray Brown Fine to Medium Gravel	
							2.6 - 2.9	Gray Brown Fine to Medium Sand, Trace Coarse Sand	
KRT6	KRT6-5	6.5	4.3	4.3	4.0	Coarse	0 - 2.4	Gray Brown, Fine to Medium Sand, Trace Silt	
							2.4 - 4.0	Light Gray Brown Fine to Coarse Sand	
KRT6	KRT6-6	5.0	2.1	1.9	1.8	Coarse	0 - 0.30	Dark Gray Brown Fine Sand, Little Silt	
							0.30 - 1.6	Orange Brown Fine to Medium Sand, Trace Coarse Sand	
							1.6 - 1.8	Coarse Gravel	
KRT6	KRT6-7	2.0	2.6	2.5	1.9	Fine	0 - 1.9	Dark Gray Brown Fine Sand And Silt, Trace Organics (Wood)	
KRT6	KRT6-8	0	1.8	2.0	1.4	Fine	0 - 1.4	Dark Gray Brown Fine Sand And Silt, Trace Organics (Wood)	
KRT7	KRT7-1	0	2.9	2.4	1.9	Fine	0 - 0.20	Gray Brown/Fine to Medium Sand/Trace Coarse Sand	
							0.20 - 1.9	Dark Gray Brown/Fine Sand And Silt/Trace Organics (Shells)	
KRT7	KRT7-2	3.1	3.0	2.0	0.65	Coarse	0 - 0.65	Gray Brown/Fine to Medium Sand/Trace Coarse Sand/Trace Fine to Medium Gravel	
KRT7	KRT7-3	3.1	3.7	3.0	2.9	Coarse	0 - 0.50	Orange Brown/Fine to Medium Sand/Trace Coarse Sand	
							0.50 - 1.1	Dark Gray Brown/Fine to Coarse Sand/Trace Silt	
							1.1 - 1.7	Light Gray/Fine to Medium Sand/Trace Coarse Sand	
							1.7 - 2.9	Brown/Fine to Medium Sand	
KRT7	KRT7-4	3.0	2.4	2.2	2.0	Coarse	0 - 0.60	Brown/Fine to Medium Sand/Trace Coarse Sand/Trace Fine to Medium	
							0.60 - 2.0	Gray/Fine to Medium Sand/Trace Coarse Sand/Trace Fine to Medium	
KRT7	KRT7-5	2.7	2.1	1.0	0.80	Coarse	0 - 0.80	Brown/Fine to Medium Sand/Little Coarse Sand/Trace Fine to Medium	
KRT7	KRT7-6	2.3	1.1	1.0	0.75	Coarse	0 - 0.75	Gray Brown/Fine to Coarse Sand/Little Fine to Medium Gravel	
KRT7	KRT7-7	2.4	1.2	1.4	1.4	Coarse	0 - 1.4	Gray Brown/Fine to Medium Sand/Little Coarse Sand/Trace Fine to Medium	
KRT7	KRT7-8	1.5	1.0	0.90	0.90	Coarse	0 - 0.10	Fine to Medium Gravel	
							0.10 - 0.90	Dark Gray/Fine to Medium Sand/Little Coarse Sand/Trace Fine to Medium	
KRT8	KRT8-1	0	2.5	2.0	1.2	Fine	0 - 1.2	Dark Gray Brown Silt/Clay, Trace Fine Sand	

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Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description	
KRT8	KRT8-2	0.90	4.4	3.5	2.7	Fine	0 - 0.20	Brown Fine Sand	
							0.20 - 2.0	Dark Gray Brown Soft Silt, Trace Fine Sand, Trace Organics	
							2.0 - 2.7	Gray Fine to Medium Sand, Trace Coarse Sand	
KRT8	KRT8-3	1.6	0.5	1.0	1.0	Coarse	0 - 0.30	Orange Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine	
							0.30 - 1.0	Dark Gray Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel	
							0 - 0.20	Orange Brown Fine to Medium Sand, Trace Coarse Sand	
KRT8	KRT8-4	2.6	5.0	1.8	1.5	Coarse	0.20 - 1.5	Gray Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium	
							0 - 1.2	Gray Brown Fine to Coarse Sand, Trace/Little Fine to Medium Gravel	
							0 - 0.20	Orange Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel	
KRT8	KRT8-6	2.4	0.3	1.9	1.9	Coarse	0.20 - 0.70	Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel	
							0.70 - 1.9	Gray Fine to Coarse Sand, Trace Fine to Medium Gravel	
							0 - 0.60	Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel	
KRT8	KRT8-8	0.60	4.5	2.4	1.8	Coarse	0 - 1.1	Dark Gray Brown Fine Sand/Silt	
							1.1 - 1.8	Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel	
							0 - 0.50	Dark Gray Brown Fine Sand, Trace Silt	
KRT9	KRT9-1	2.3	1.3	1.0	0.70	Coarse	0.50 - 0.70	Dark Gray Brown Fine to Coarse Sand, Trace Fine Gravel	
							0 - 0.20	Brown Fine Sand, Trace Silt, Trace Organics	
							0.20 - 0.95	Dark Gray Fine Sand, Trace Silt	
KRT9	KRT9-3	3.8	0.6	0.60	0.55	Coarse	0 - 0.20	Brown Fine Sand, Trace Silt	
							0.20 - 0.55	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine Gravel	
							0 - 0.85	Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel	
KRT9	KRT9-4	6.3	3.1	1.0	0.85	Coarse	0 - 1.3	Orange Brown Fine to Coarse Sand, Trace/Little Fine to Medium Gravel	
							0 - 0.20	Gray Brown Fine Sand	
							0.20 - 1.0	Gray Brown Fine to Coarse Sand, Trace Fine Gravel	
KRT9	KRT9-7	3.1	1.5	0.50	0.35	Coarse	0 - 0.20	Brown Fine Sand	
							0.20 - 0.35	Brown Fine to Coarse Sand, Coarse Gravel In Tip of Core (Bottom)	
							0 - 0.40	Dark Brown Loose Silt, Trace Fine Sand, Coarse Gravel In Bottom of	
KRT10	KRT10-1	0	4.0	4.0	2.4	Fine	0 - 2.0	Dark Brown Loose Silt, Trace Fine Sand, Trace Organics (Odor/Sheens)	
							2.0 - 2.4	Light Brown Fine Sand/Silt	

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 1 – Sediment Core/Probing Data - Kalamazoo River Transects

Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description
KRT10	KRT10-2	2.0	0.4	0.70	0.70	Fine	0 - 0.30	Dark Brown Very Loose Silt
							0.30 - 0.70	Dark Gray Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel
KRT10	KRT10-3	2.9	0.6	0.50	0.35	Coarse	0 - 0.35	Brown Fine to Coarse Sand, Little Fine to Medium Gravel
KRT10	KRT10-4	3.2	2.4	1.5	1.4	Coarse	0 - 1.4	Gray Brown Grading to Light Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel
KRT10	KRT10-5	3.4	1.9	1.7	1.5	Coarse	0 - 0.30	Brown Fine to Medium Sand, Trace Coarse Sand, Trace Shells
							0.30 - 1.5	Light Gray Brown Fine to Coarse Sand, Trace Fine to Medium Gravel
KRT10	KRT10-6	2.2	0.4	0.50	0.50	Coarse	0 - 0.50	Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium
KRT10	KRT10-7	1.4	1.1	1.0	0.95	Coarse	0 - 0.25	Brown Fine Sand, Trace Organics
							0.25 - 1.0	Dark Gray Brown Fine to Medium Sand, Trace Coarse Sand, Trace Fine to Medium Gravel
							0 - 0.85	Dark Gray Brown Fine Sand, Trace Silt
KRT10	KRT10-8	1.2	2.3	2.2	1.8	Coarse	0.85 - 1.8	Light Gray Brown Fine to Medium Sand, Little Coarse Sand, Trace Fine to Medium Gravel
							1.3 - 1.6	Gray Brown Very Fine Sand to Medium Sand, Trace Shell
							1.1 - 1.3	Gray Fine to Medium Sand
KRT11	KRT11-1	5.0	2.5	2.0	1.6	Coarse	0 - 0	No Recovery
KRT11	KRT11-3	8.4	2.0	1.8	1.4	Coarse	0 - 0.050	Brown Very Fine Sand
							0.050 - 0.25	Brown Fine Sand
							0.25 - 1.4	Gray Brown Fine to Coarse Sand
							0 - 0.050	Brown Fine to Coarse Sand, Gravel
KRT11	KRT11-4	9.4	2.6	1.2	0.95	Coarse	0.050 - 0.95	Gray Clay (Marbleize)
							0 - 0.15	Brown Very Fine Sand to Fine Sand
							0.15 - 0.30	Brown Medium to Coarse Sand, Trace Gravel, Trace Shell
KRT11	KRT11-5	8.8	1.2	0.60	0.30	Fine	0 - 0.40	Gray Brown Very Fine Sand to Fine Sand
							0.40 - 1.1	Gray Brown Fine to Coarse Sand, Trace Gravel
							0 - 0.10	Gray Black Very Fine Sand, Silt
KRT11	KRT11-6	5.5	1.5	1.4	1.1	Coarse	0.10 - 1.8	Gray Medium to Coarse Sand, Fine Gravel, Trace Cobble
							0.10 - 1.5	Dark Black Silt, Very Fine Sand, Leaves
							1.5 - 2.6	Gray Black Fine to Medium Sand
KRT11	KRT11-7	1.9	3.1	2.4	1.8	Coarse	2.6 - 2.7	Gray Black Fine to Coarse Sand, Silt
							2.7 - 4.2	Gray Black Very Fine Sand, Silt
							0 - 0.10	Gray Black Medium Sand to Coarse Sand, Trace Gravel
							0.40 - 0.60	Black Silt With Gray Fine Sand Over Rock
KRT12	KRT12-1	0.80	2.2	2.2	1.8	Fine	0 - 0.40	Gravel Over Fine to Medium Sand
							0.40 - 0.60	Gray Clay

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 1 – Sediment Core/Probing Data - Kalamazoo River Transects

Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description	
KRT12	KRT12-3	7.6	1.2	2.3	2.1	Coarse	0 - 1.0	Brown to Gray Medium Sand	
							1.0 - 1.6	Gray Fine Sand	
							1.6 - 2.1	Gray Black Very Fine Sand to Fine Sand With Trace Silt	
KRT12	KRT12-4	6.5	3.8	3.5	2.8	Coarse	0 - 0.90	Brown Medium to Coarse Sand With Shells	
							0.90 - 1.5	Gray Black Fine to Medium Sand	
							1.5 - 2.8	Gray Black Fine Sand	
KRT12	KRT12-5	5.6	1.7	1.5	1.1	Coarse	0 - 0.40	Brown Fine Sand	
							0.40 - 1.1	Brown Medium to Coarse Sand With Trace Gravel	
KRT12	KRT12-6	4.0	3.7	2.7	2.1	Coarse	0 - 2.1	Gray Black Fine Sand With Trace Leaves	
KRT12	KRT12-7	1.6	4.6	3.0	2.6	Coarse	0 - 1.8	Gray Black Fine Sand	
							1.8 - 1.9	Brown Medium to Coarse Sand	
							1.9 - 2.6	Black Very Fine Sand to Fine Sand	
KRT12	KRT12-8	0.50	6.5	3.5	2.5	Fine	0 - 2.5	Gray Black Very Fine Sand to Fine Sand	
KRT13	KRT13-1	0.15	1.0	0.60	0.40	Coarse	0 - 0.40	Gray Brown Fine Sand, Roots	
KRT13	KRT13-2	2.3	0.1	0.10	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-3	2.7	0.1	0.10	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-4	3.3	0.0	0	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-5	2.8	0.0	0	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-6	2.4	0.0	0	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-7	2.3	0.1	0	0	Coarse	0 - 0	No Recovery	
KRT13	KRT13-8	1.1	0.9	0.90	0.80	Fine	0 - 0.10	Brown Fine Sand, Few Shells	
							0.10 - 0.80	Gray Very Fine Sand/Silt	
KRT14	KRT14-1	0.70	0.6	0.40	0.20	Coarse	0 - 0.20	Gray Brown Fine to Coarse Sand, Trace Gravel	
							0 - 0.40	Gray Brown Fine Sand	
							0.40 - 0.60	Gray Brown Medium to Coarse Sand, Trace Gravel	
KRT14	KRT14-3	2.5	1.4	1.4	1.2	Coarse	0 - 0.70	Gray Brown Fine to Medium Sand	
							0.70 - 0.80	Gray Black Fine Sand	
							0.80 - 1.2	Gray Fine Sand	
KRT14	KRT14-4	4.2	1.9	2.0	1.9	Coarse	0 - 0.95	Brown Fine to Coarse Sand, Trace Gravel	
							0.95 - 1.9	Gray Fine Sand, Trace Medium Sand	
KRT14	KRT14-5	4.1	2.3	1.8	1.3	Coarse	0 - 0.60	Brown Medium to Coarse Sand, Shells	
							0.60 - 1.3	Gray Medium to Coarse Sand, Trace Gravel	
KRT14	KRT14-6	3.2	0.0	0	0	Coarse	0 - 0	No Recovery	
							0 - 0.40	Brown Fine to Coarse Sand	
KRT14	KRT14-7	3.7	0.6	0.60	0.45	Coarse	0.40 - 0.50	Brown Coarse Sand, Trace Gravel	
							0.80 - 1.0	Gray Brown Fine to Medium Sand	
KRT15	KRT15-1	0.10	1.0	1.0	0.80	Coarse	0 - 0.80	Gray Brown Fine Sand, Trace Medium Sand	

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 1 – Sediment Core/Probing Data - Kalamazoo River Transects

Transect	Location ID	Water Depth (ft)	Probing Depth (ft)	Sediment Penetrated (ft)	Sediment Recovered (ft)	Texture Class	Depth Interval (ft)	Sediment Description	
KRT15	KRT15-2	1.7	2.8	1.6	1.2	Coarse	0 - 0.30	Gray Brown Fine Sand, Trace Medium to Coarse Sand	
							0.30 - 1.2	Gray Black Fine Sand	
KRT15	KRT15-3	3.5	4.3	0.80	0.80	Coarse	0 - 0.10	Brown Fine Sand, Trace Gravel, Shell	
							0.10 - 0.80	Gray Brown Fine to Medium Sand	
KRT15	KRT15-4	4.0	0.4	0.40	0.40	Coarse	0 - 0.40	Brown Fine to Coarse Sand, Trace Gravel	
KRT15	KRT15-5	4.0	0.5	0.50	0.15	Coarse	0 - 0.15	Brown Fine Sand Mixed With Coarse Gravel, Some Shells	
KRT15	KRT15-6	3.3	1.8	1.4	0.90	Coarse	0 - 0.10	Gravel Rock	
							0.10 - 0.90	Gray Brown Fine to Medium Sand	
KRT15	KRT15-7	2.6	2.2	1.9	1.5	Coarse	0 - 1.5	Fine to Very Coarse Sand Mixture	
KRT15	KRT15-8	0.70	2.8	3.0	3.0	Coarse	0 - 0.10	Gray Brown Very Fine Sand, Silt	
							0.10 - 2.0	Brown Fine to Medium Sand	
							2.0 - 3.0	Brown Fine to Coarse Sand	
KRT16	KRT16-1	0.55	4.0	1.5	1.2	Coarse	0 - 1.1	Gray Black Fine Sand, Trace Medium Sand	
							1.1 - 1.2	Gravel Rock	
KRT16	KRT16-2	4.6	0.1	0	0	Coarse	0 - 0	No Recovery	
KRT16	KRT16-3	4.5	0.1	0	0	Coarse	0 - 0	No Recovery	
KRT16	KRT16-4	3.4	0.4	0.40	0.20	Coarse	0 - 0.20	Brown Fine to Coarse Sand, Trace Gravel	
KRT16	KRT16-5	2.9	0.4	0.40	0.20	Coarse	0 - 0.20	Brown Fine Sand, Trace Organics	
KRT16	KRT16-6	1.7	1.6	1.6	1.2	Coarse	0 - 0.10	Brown Very Fine Sand to Fine Sand, Wood	
							0.10 - 1.2	Gray Brown Fine Sand	
							0.20 - 2.2	Gray Black Fine Sand	
KRT16	KRT16-7	1.5	2.5	2.6	2.2	Coarse	0 - 0.20	Brown Fine Sand	
							0.20 - 1.3	Silt, Very Fine Sand, Gray Black	
KRT16	KRT16-8	0.20	2.0	2.0	1.3	Fine	0 - 0.60	Gray Residual, Wood	

Notes:

ft - feet

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 2 – Summary of Sediment Transect Probing Data - Kalamazoo River Transects

Transect	Water Depth		Probing Depth	
	Range (ft)	Mean (ft)	Range (ft)	Mean (ft)
KRT1	0 - 4.1	2.8	0 - 5.0	2.1
KRT2	0 - 5.2	2.3	1.4 - 7.8	5.2
KRT3	0.55 - 8.2	4.3	1.0 - 4.6	2.5
KRT4	0.45 - 8.2	4.1	0.90 - 7.1	3.3
KRT5	0 - 9.9	5.8	2.2 - 5.7	3.8
KRT6	0 - 7.3	4.3	1.8 - 5.5	3.5
KRT7	0 - 3.1	2.3	1.0 - 3.7	2.2
KRT8	0 - 2.7	1.7	0.30 - 5.0	2.4
KRT9	1.5 - 7.2	4.2	0.20 - 3.1	1.6
KRT10	0 - 3.4	2.0	0.40 - 4.0	1.6
KRT11	0.10 - 9.4	5.8	0.10 - 8.5	2.7
KRT12	0.50 - 7.6	4.2	0.90 - 6.5	3.1
KRT13	0.15 - 3.3	2.1	0 - 1.0	0.28
KRT14	0.50 - 4.2	2.6	0 - 2.3	1.3
KRT15	0.10 - 4.0	2.5	0.40 - 4.3	2.0
KRT16	0.20 - 4.6	2.4	0.10 - 4.0	1.4

Notes:

ft - feet

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 3 – Summary of Sediment Core Texture - Kalamazoo River Transects

Transect	Number of Core Locations	Number of Coarse Sediment Locations	Number of Fine Sediment Locations
KRT1	8	8	0
KRT2	8	5	3
KRT3	8	6	2
KRT4	8	7	1
KRT5	8	5	3
KRT6	8	5	3
KRT7	8	7	1
KRT8	8	6	2
KRT9	8	6	2
KRT10	8	6	2
KRT11	8	7	1
KRT12	8	6	2
KRT13	8	7	1
KRT14	8	8	0
KRT15	8	8	0
KRT16	8	7	1
Total	128	104 (81%)	24 (19%)

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Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 4 - Core Location Breakdown - Georgia-Pacific Mill to Crown Vantage Landfill

River Interval	Transects	# Fine	# Coarse
Georgia-Pacific Mill to Portage Creek	KRT1 - KRT2	3	3
Portage Creek to Mosel Avenue	KRT3 - KRT6	9	3
Mosel Avenue to Crown Vantage	KRT7 - KRT10	7	5
	Total	19	11
		63%	37%

Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 5 - Core Locations Selected for Analysis - Georgia-Pacific Mill to Crown Vantage Landfill

River Interval	Sample ID	Sediment Classification	Distance from Right Bank (ft)	Core Length (ft)
Georgia-Pacific Mill to Portage Creek	KRT1-4	Coarse	102	0.45
	KRT1-6	Coarse	170	1.4
	KRT2-2	Coarse	36	2.7
	KRT2-6	Fine ⁽¹⁾	180	2.3
	KRT2-7	Fine	216	0.9
	KRT2-8	Fine	249	3.1
	KRT3-1	Fine	0	1.1
Portage Creek to Mosel Avenue	KRT3-4	Coarse	60	0.8
	KRT3-8	Fine	139	2.2
	KRT4-2	Fine	21	4.5
	KRT4-5	Coarse	84	1.3
	KRT4-8	Coarse	144.4	1.7
	KRT5-1	Fine	0	2
	KRT5-3	Fine	34	4.1
	KRT5-4	Fine	51	2.7
	KRT6-2	Fine	28	2.9
	KRT6-7	Fine	168	1.9
	KRT6-8	Fine	194	1.4
Mosel Avenue to Crown Vantage	KRT7-1	Fine	0	
	KRT7-5	Coarse	104	0.8
	KRT8-1	Fine	0	0.9
	KRT8-2	Fine	35	1.2
	KRT8-5	Coarse	140	2.7
	KRT8-8	Coarse	246	1.8
	KRT9-2	Fine	18	0.95
	KRT9-5	Coarse	72	1.3
	KRT9-8	Fine ⁽¹⁾	123	0.4
	KRT10-1	Fine	0	2.4
	KRT10-2	Fine		0.7
	KRT10-5	Coarse	132	1.8

Note:

1. Core location proposed for TCL/TAL and SEM/AVS analysis.

Kalamazoo River Study Group
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Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

Table 6 - Core Location Breakdown - Plainwell No. 2 Dam to Mill Race Confluence

River Interval	Transects	# Fine	# Coarse
Kalamazoo River	KRT11 - KRT13	4	5
Mill Race	KRT14 - KRT 15	0	6
Mill Race Confluence	KRT16	1	2
	Total	5	13
		28%	72%

Kalamazoo River Study Group
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Supplemental Remedial Investigations/Feasibility Studies
Kalamazoo River SRI Phase 2 Sediment Core Analyses Plan

**Table 7 - Core Locations Selected for Analysis - Plainwell No. 2 Dam to
Mill Race Confluence**

River Interval	Sample ID	Sediment Classification	Distance from Right Bank (ft)
Kalamazoo River	KRT11-1	Coarse	0
	KRT11-5	Fine	55
	KRT11-8	Coarse	96
	KRT12-1	Fine	0
	KRT12-4	Coarse	55.5
	KRT12-8	Fine	130
	KRT13-1	Coarse	0
	KRT13-5	Coarse	68
	KRT13-8	Fine ⁽¹⁾	118
Mill Race	KRT14-1	Coarse	0
	KRT14-5	Coarse	46
	KRT14-7	Coarse	69
	KRT15-1	Coarse	0 ^a
	KRT15-4	Coarse	25.5
	KRT15-8	Coarse	59
Mill Race Confluence	KRT16-1	Coarse	0
	KRT16-6	Coarse	175
	KRT16-8	Fine ⁽¹⁾	248

Note:

1. Core location proposed for TCL/TAL and SEM/AVS analysis.

ARCADIS

Figures

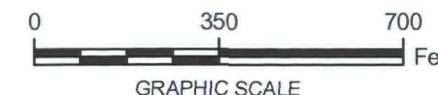


LEGEND:

- SOIL SAMPLING LOCATION
- SEDIMENT SAMPLING LOCATION

MATERIAL CLASSIFICATION:

- FINE
- COARSE



NOTES:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AIR LAND SURVEYS, INC., KALAMAZOO RIVER FLOWN 4/24/99, PORTAGE CREEK FLOWN 4/27/00.
2. SAMPLES COLLECTED OCTOBER 2007.
3. NO MATERIAL CLASSIFICATION EXISTS FOR TOP OF BANK SOIL SAMPLE LOCATIONS.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN

SEDIMENT TRANSECT SAMPLING
CHARACTERIZATION - FORMER GEORGIA-
PACIFIC MILL LAGOONS TO PORTAGE CREEK



LEGEND:

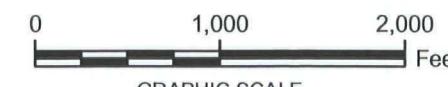
○ SOIL SAMPLING LOCATION

SEDIMENT SAMPLING LOCATION

MATERIAL CLASSIFICATION:

● FINE

○ COARSE



GRAPHIC SCALE

NOTES:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AIR LAND SURVEYS, INC., KALAMAZOO RIVER FLOWN 4/24/99, PORTAGE CREEK FLOWN 4/27/00.
2. SAMPLES COLLECTED OCTOBER 2007.
3. NO MATERIAL CLASSIFICATION EXISTS FOR TOP OF BANK SOIL SAMPLE LOCATIONS.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN**

**SEDIMENT TRANSECT SAMPLING
CHARACTERIZATION - PORTAGE
CREEK TO CROWN VANTAGE LANDFILL**

ARCADIS



SYR-85 MTK.AMB
KRSG (B0064524.0000.0500)
Q:KRSG:MorrowDamToPerryellDamISRI_Phase2CoreAnalysisPlan_KRSGmxdsSediment Sample Status - GP Mill to PC_v2.mxd - 11/14/2008 @ 1:22:29 PM

LEGEND:

- EXISTING SEDIMENT CORE PCB DATA
- SEDIMENT SAMPLES TO REMAIN ARCHIVED

SEDIMENT SAMPLES TO BE ANALYZED

MATERIAL CLASSIFICATION:

- FINE SEDIMENT CORE SAMPLE SELECTED FOR ANALYSIS
- COARSE SEDIMENT CORE SAMPLE SELECTED FOR ANALYSIS



NOTE:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AIR LAND SURVEYS, INC., KALAMAZOO RIVER FLOWN 4/24/99, PORTAGE CREEK FLOWN 4/27/00.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN**

**SEDIMENT SAMPLES TO BE ANALYZED
FOR TOTAL PCBs - GEORGIA-PACIFIC
MILL TO PORTAGE CREEK**



FIGURE
3



LEGEND:

- ▲ EXISTING SURFACE PCB DATA
- EXISTING SEDIMENT CORE PCB DATA
- SEDIMENT SAMPLES TO REMAIN ARCHIVED

SEDIMENT SAMPLES TO BE ANALYZED

MATERIAL CLASSIFICATION:

- FINE SEDIMENT CORE SAMPLE SELECTED FOR ANALYSIS
- COARSE SEDIMENT CORE SAMPLE SELECTED FOR ANALYSIS

0 1,000 2,000
GRAPHIC SCALE

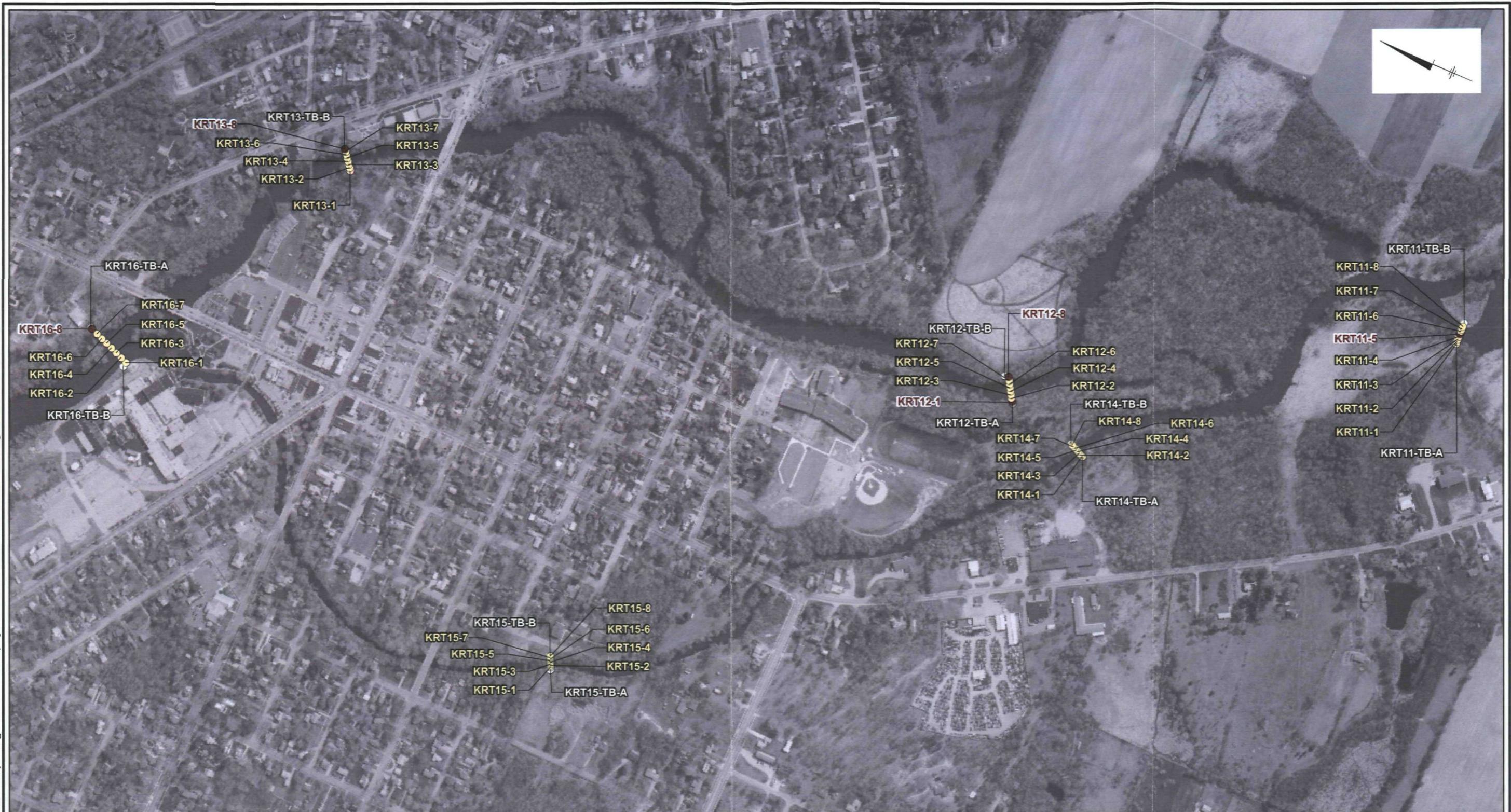
NOTE:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AIR LAND SURVEYS, INC., KALAMAZOO RIVER FLOWN 4/24/99, PORTAGE CREEK FLOWN 4/27/00.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN**

**SEDIMENT SAMPLES TO BE ANALYZED
FOR TOTAL PCBs - PORTAGE
CREEK TO CROWN VANTAGE LANDFILL**





LEGEND:

○ SOIL SAMPLING LOCATION

SEDIMENT SAMPLING LOCATION

MATERIAL CLASSIFICATION:

● FINE

○ COARSE

0 500 1,000
Feet
GRAPHIC SCALE

NOTES:

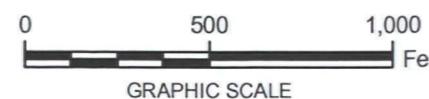
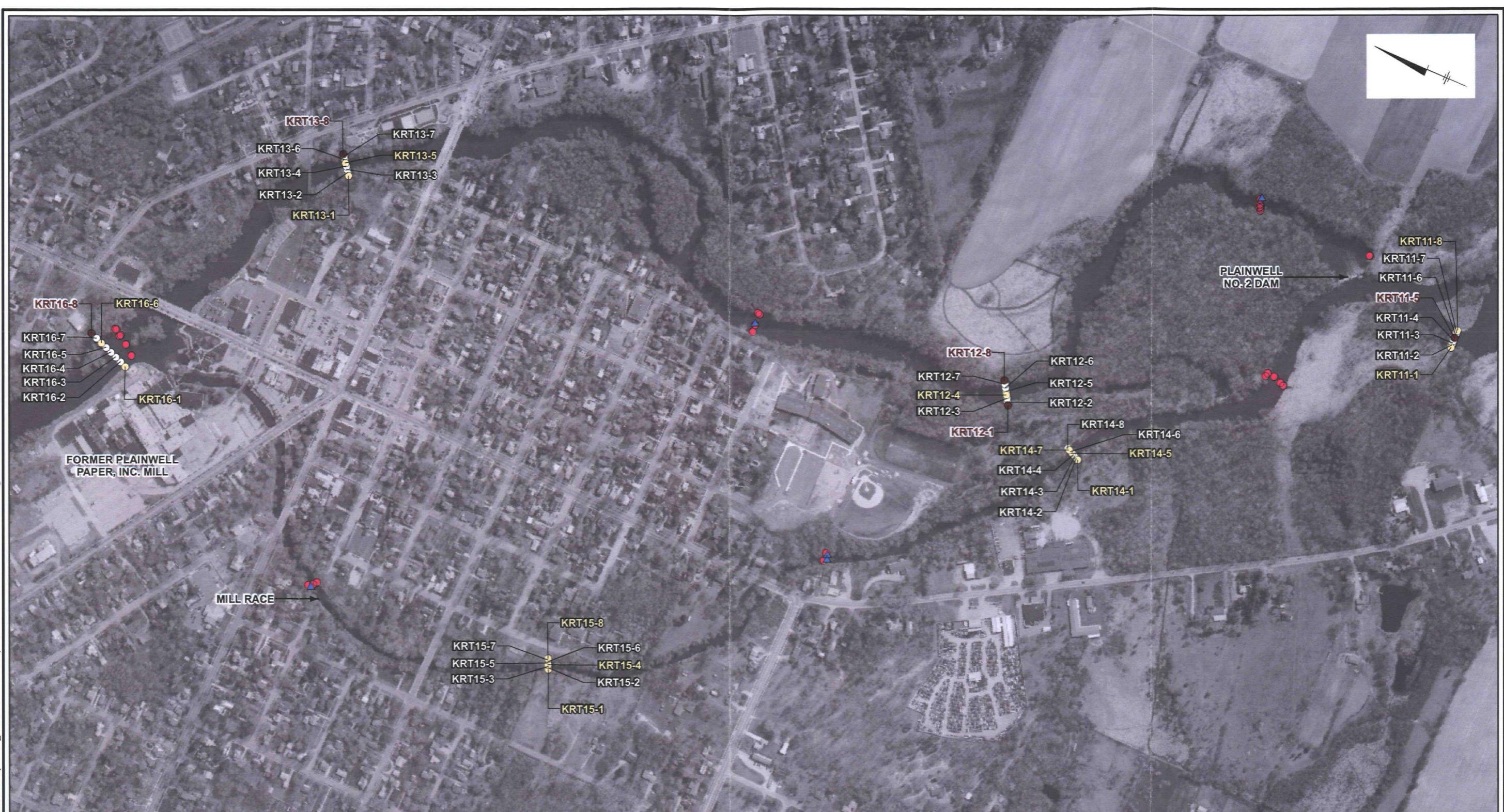
1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AIR LAND SURVEYS, INC., KALAMAZOO RIVER FLOWN 4/24/99, PORTAGE CREEK FLOWN 4/27/00.
2. SAMPLES COLLECTED OCTOBER 2007.
3. NO MATERIAL CLASSIFICATION EXISTS FOR TOP OF BANK SOIL SAMPLE LOCATIONS.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN**

**SEDIMENT TRANSECT SAMPLING
CHARACTERIZATION - UPSTREAM OF PLAINWELL
NO. 2 DAM TO MILL RACE CONFLUENCE**



FIGURE
5



NOTE:

- AERIAL IMAGERY COLLECTED IN 2004 PROVIDED BY PREIN & NEWHOF.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
**KALAMAZOO RIVER SRI PHASE 2
SEDIMENT CORE ANALYSES PLAN**

**SEDIMENT SAMPLES TO BE ANALYZED
FOR TOTAL PCBs - UPSTREAM OF PLAINWELL
No. 2 DAM TO MILL RACE CONFLUENCE**



FIGURE
6

ARCADIS

Attachment 1

1997 Kalamazoo Sediment
Particle Size Analysis Letter



Transmitted Via Federal Express

December 1, 1997

Mr. Scott Cornelius
MDEQ-ERD
Superfund Section
301 S. Capital Avenue
Lansing, MI 48933

Re: Kalamazoo Sediment Particle Size Analysis
Project #: 645.24.112

Dear Scott:

This correspondence provides a preliminary interpretation of particle size results for the Kalamazoo River Phase II sediment cores and transmits tables presenting the particle size data. At this time, results have been received for all samples submitted for particle size analysis; these results are summarized in Table 1. Also included herein are tables and figures specific to those cores which MDEQ felt were initially misclassified as fine-grained (56 cores communicated by John Bradley on July 30, 1997); these data (Table 2) were evaluated to assess the potential effect of misclassification on the stratified sediment sampling strategy. In addition, possible future action as a result of the review of these data is suggested.

Based on the original designation of cores as either coarse or fine, Figures 1A, 2A and 3A plot the data to show relationships among median particle size, percent silts and clays, and percent solids. The graphs indicate that there is a good separation of coarse and fine designations in general, with some degree of overlap. While overlap is not entirely unexpected when applying a binomial classification to a continuous type population, attempts should be made to minimize the overlap where possible.

Prior to analysis of any particle size data from the laboratory, each core for which the analysis was scheduled was re-classified based on the physical description recorded in the field logs at the time of core collection. Independent of both the previous classification and the analytical results, cores were re-classified using a simple 0 to 5 numeric system where 0 represents rock and gravel, 1 represents gravel with some sands, 2 represents medium to coarse sands, 3 represents fine sands with a trace of medium to coarse sands, 4 represents silts with fine sands, and 5 represents silts and organic matter. Units of 0.5 were used in the rating scheme. Cores were rated based on the relative amounts of sediment constituents according to field notes, and although subjective, the rating was performed consistently to serve as a comparative benchmark against which laboratory particle size results and original classifications could be evaluated to draw conclusions regarding the status of the disputed cores. Figure 4 shows the distribution of cores originally classified as fine or coarse sorted by the new classification. Also shown is the distribution of the disputed cores, which clearly reflect the area of overlap between the coarse and fine distributions.

Scott Cornelius
MDEQ-ERD
December 1, 1997
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Figures 1B, 2B and 3B allow comparison of the disputed core distributions and the total distribution of all particle size data. The disputed cores reflect the area of overlap between fine and coarse classification. When viewed in terms of the numeric classification, those re-classified as 3.5 or greater generally tend towards fines, those 2.5 or less tend toward coarse, and those given the 3 classification represent the most transitional value. Figures 5 and 6, bar chart presentations of median particle diameter and percentages of clays, silts and sands in the disputed cores sorted by numeric classification serve to reinforce this point. Use of 2.5 and below as coarse, 3.5 and above as fine, and 3 as a transitional value adequately reflect the larger data set as shown in Figures 7 and 8.

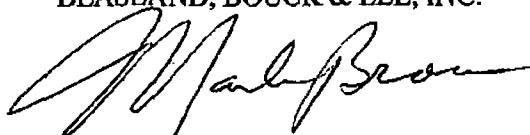
Based upon this preliminary review of the particle size data from 398 cores (40 of which were from Portage Creek), the following are recommended:

- Substitute cores should be selected and analyzed for each fine core that was classified 2.5 or lower (coarse) and where silt and clay comprised less than 10% by weight (a total of 18 cores, 12 of which were identified by MDEQ and 6 others). To supplement these cores, the nearest core with a numeric rating of 3.5 or greater would be used. Table 3 lists the cores recommended for replacement.
- Substitute cores for fine cores which were re-classified with a 3 should replace another 12 cores which have less than 10% silt and clay and median particle size greater than 1,000 μm . Table 3 lists the cores recommended for replacement.
- The classification of other cores as fine or coarse may be modified based on particle size and percent solids data, but other than those cores listed in Table 3 that are to be substituted for, no additional core analysis is proposed. Even with these changes, there will be enough each of fine and coarse cores to perform the Phase II sediment investigation as originally planned.

If you have any questions about the contents of this letter and its recommendations, please give me a call.

Sincerely,

BLASLAND, BOUCK & LEE, INC.



Mark P. Brown
Vice President

MPB/ccm

Scott Cornelius
MDEQ-ERD
December 1, 1997
Page 3 of 3

cc: Cynthia V. Bailey, Esq.
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Mark Hawley, Ph.D.

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sample ID	Duplicate ID	Location	Depth Increment (ft)	% Solids	Percentile Sizes (µm)			Percent finer than				
					16%	50%	84%	Gravel	#10 Sieve	#40A Sieve	#200 Sieve	5 mm
K51370		KPT1-1	0.17 - 1	81.7	140	280	650	100	95.7	72.7	9.9	1.5
K50490		KPT1-2	0.17 - 1	86.9	270	700	6500	91.5	63.8	37.8	3.6	1.1
K50444		KPT1-4	0.17 - 1	92.3	360	2800	8000	64.9	40.5	21.4	2.1	0.7
K50455		KPT1-6	0.17 - 0.67	77	190	380	4400	85	77	57.6	4.7	1.1
K50145		KPT2-6	0.17 - 1	80	80	200	450	96.6	95.4	82.5	15.1	4.6
K50278		KPT3-1	0.17 - 0.83	71.8	140	250	400	100	99.5	87.6	8.9	3.9
K50440		KPT3-2	0.17 - 1	92.7	300	1200	6500	78.1	59.7	27.7	2.8	0.7
K50470		KPT3-3	0.17 - 0.67	89.2	32	800	10000	73	61.7	39.6	18.9	8.7
K50452		KPT3-6	0.17 - 1	84.9	420	2500	6200	76.2	43.2	16.4	5.3	0.7
K50473		KPT3-7	0.17 - 1	86.1	190	400	2000	94.5	84.2	52.3	4.7	1.3
K50426		KPT4-1	0.17 - 1	88.2	230	850	14000	67.6	57.6	39.7	3.1	0.7
K50432		KPT4-2	0.17 - 1	83.7	200	380	4750	83.9	75.9	56.9	2.2	0.7
K50463		KPT4-5	0.17 - 1	93.4	425	4750	12000	50.2	32.3	18	5.2	0.3
K50548		KPT4-6	0.17 - 1	89.9	260	2200	7800	91.6	47.7	29.6	2.6	0.6
K51293	K51295	KPT5-1	0.17 - 1	91.3	500	5800	16000	69.2	27.6	14.6	1.8	0.6
K51315		KPT5-3	0.17 - 1	79.3	170	300	2500	86.6	83.6	69.7	11.1	4.4
K51332		KPT5-4	0.17 - 0.75	91.7	210	2300	11000	82.7	46.6	26.7	4.6	0.5
K51327		KPT5-6	0.17 - 1	87.6	350	4500	12500	74.8	38	20.9	1.4	0.3
K50526		KPT5-8	0.17 - 1	77.1	95	230	410	100	98.5	88.4	12.8	6
K50434		KPT6-5	0.17 - 1	89.4	300	2200	8000	66.9	48.5	27.4	3.3	0.7
K50438		KPT6-8	0.17 - 1.08	79	100	170	3000	87	80.7	62.9	11.1	2.4
K50446		KPT8-3	0.17 - 0.75	83.7	70	700	5000	82.5	63.6	42.6	17	0.6
K50281		KPT10-3	0.17 - 1	92.4	310	770	4500	85.5	67.9	27.5	5.5	1.1
K50924		KPT10-3	0.17 - 1	88.7	300	740	2700	99.1	79.7	23.8	7.8	1.6
K50442		KPT10-5	0.17 - 1	94.1	420	3000	12000	59.8	39.9	16.4	5.1	0.7
K50594		KPT12-4	0.17 - 1	86.2	290	700	4400	94.9	72.3	32.9	3.8	0.6
K50568		KPT13-4	0.17 - 1	82.3	200	425	5000	95.1	75.8	49.7	6.1	0.8
K50007		KPT14-2	0 - 0.33	37.6	13	80	150	100	100	98.8	47.6	13
K50008		KPT14-2	0.33 - 4.1	78	80	225	450	93.7	91.5	83.2	15.1	3.7
K51385		KPT14-6	0.17 - 1	76.2	190	300	660	100	96.5	72.3	4	0.8
K50845		KPT17-3	0.17 - 1	87.7	295	1100	8000	87.7	58.7	29	2.2	0.7
K51168		KPT17-7	0.17 - 1	93.3	320	2000	9000	84.3	51.2	20.4	7	0.5
K50778		KPT18-2	0.17 - 1.17	87.5	71.7	3800	300	71.7	35.8	22.3	4.6	2.5
K50843		KPT18-3	0.17 - 1	88.9	600	8600	20000	52.4	24.8	12.5	2.2	0.7
K51006		KPT18-5	0.17 - 0.83	86.9	290	700	6000	90.6	68.6	31.3	4.6	0.6
K50016		KPT19-3	0 - 0.33	78	240	375	700	100	99.4	61.9	0.2	1.8
K50017	K50019	KPT19-3	0.33 - 4.9	82.6	60	300	630	100	99.1	72.3	19.6	4.8
K50019	K50017	KPT19-3	0.33 - 4.9	74	120	300	650	100	99.5	70.7	13	6.2
K51016		KPT19-5	0.17 - 1	85.4	260	400	900	100	94.2	56.5	2.4	0.2
K51246		KPT19-8	0.17 - 1	69.4	160	450	6000	90.3	68.1	49.1	10.2	4.4
K51093		KPT20-2	0.17 - 1.08	89.5	220	800	15000	66.9	56.3	39	1.6	0.3
K50830		KPT20-3	0.17 - 0.67	87.5	30	190	1600	96.6	86.5	69.8	41.2	2.2
K51004		KPT20-4	0.17 - 1	91.5	200	1400	9000	85.9	55.3	32.6	14.4	2
K50922		KPT20-5	0.17 - 1	93.2	130	800	8000	86.5	61.4	40	12.2	1.5
K50978		KPT20-7	0.17 - 0.58	90.8	280	2300	12000	90	47.2	24.6	5.5	0.9
K50875		KPT20-8	0.17 - 0.92	55.9	8.9	1000	21000	64.6	52.3	45.9	27.9	12.7
K51362	K51364	KPT21-1	0.17 - 1	85.9	150	650	700	89.1	61.6	44.4	11.3	2.3
K51319		KPT22-1	0.17 - 1	54.9	8	140	700	100	87.7	79.5	38	12.4
K51344		KPT22-6	0.17 - 0.5	72.2	12	210	520	100	96.7	80.1	36.5	12
K51366		KPT23-1	0.17 - 0.83	61.8	11	100	20000	74.3	60.7	54.8	49	11.8
K50466		KPT24-1	0.17 - 1	93.6	300	575	1400	97.5	92.6	32.1	3	0.5
K51306	K51308	KPT24-8	0.17 - 1	75.6	80	240	700	100	89.7	76.9	14.8	3.6

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sample ID	Duplicate ID	Location	Stream Order	Soil Type	Percentile Sizes (μm)				Percent Impenetrable							
					24	50	75	90	Gravel	Sand	Cobbles	Clay	10	100	200	500
K51348		KPT25-4	0 - 0.25	72.9	430	2800	8500	86.5	43.3	16.6	1.9	0.4				
K51368		KPT26-2	0.17 - 0.92	84.9	190	1200	6500	92.5	56.9	36.5	7.3	0.9				
K50021		KPT26-3	0 - 0.33	75.7	190	2000	20000	59	49.4	34.4	5.1	0.2				
K50022		KPT26-3	0.33 - 0.6	76.7	2500	21000	33000	22.2	14	8.1	1.6	0.6				
K50877		KPT26-4	0.17 - 0.5	78	310	2000	7500	91.8	49.5	25.5	3.3	1.3				
K51417		KPT26-5	0.17 - 0.83	75.8	175	420	7000	87.6	66.6	49.7	6.8	3.4				
K51355	K51358	KPT27-1	0.17 - 0.67	55.2	22	620	6500	85.6	66.1	42.3	21.9	9.1				
K51324		KPT27-2	0.17 - 1	74.9	190	600	650	90.4	65.3	43.9	5.8	1.3				
K51340		KPT27-5	0.17 - 0.42	88.9	320	3500	13000	79.5	38.6	24.4	2.7	0.3				
K51395		KPT27-8	0.17 - 0.92	75.2	200	2000	13000	75.6	50	36.3	4.2	1.3				
K50653		KPT28-1	0.17 - 1.17	44	2.3	23	425	100	90.3	84.1	69.5	28.2				
K51376	K51378	KPT28-8	0.17 - 1	71.9	130	250	800	97.4	87.8	74	10.1	1.8				
K51420		KPT29-1	0.17 - 1	64.7	27	190	11000	80.4	77.4	69.5	29.4	7.2				
K51350		KPT30-8	0.17 - 0.5	86.4	300	5000	15000	60.2	38.7	24.4	6.2	1.8				
K50669		KPT32-5	0.17 - 1	77.4	260	2000	8500	87.1	50.4	28.5	6.7	1.5				
K50649		KPT32-6	0.17 - 1	85.6	260	680	4800	92	68.9	37.8	4.1	1.6				
K50675		KPT33-4	0.17 - 1	86.1	275	4000	17000	87.2	38.6	24.2	8.8	1.1				
K50681		KPT33-7	0.17 - 0.92	76.1	240	600	5750	95.3	66.2	42.7	5.4	1.5				
K50614		KPT34-5	0.17 - 0.58	88.9	650	5900	15000	66.8	24.8	10	1.2	0.2				
K50666		KPT35-8	0 - 0.17	86.2	600	1700	4500	95.5	55.4	6.3	1	0.4				
K50667		KPT35-8	0.17 - 0.75	82.4	210	1800	14000	75.1	62.2	37.8	6	1.7				
K50573		KPT38-7	0.17 - 1	77.9	150	400	11000	81.3	68	51.4	6.4	3				
K50555		KPT39-1	0.17 - 1.17	55.8	20	130	250	100	100	97.5	18.2	6				
K50673		KPT39-2	0.17 - 0.67	84.3	400	6000	16000	59.9	30.2	17.2	2.1	1.1				
K51310		KPT40-2	0.17 - 0.83	92.9	500	8500	17000	53.2	27	13	1.8	0.3				
K50025		KPT40-5	0 - 0.33	84.4	525	5200	15000	46.7	28.2	13.7	5.5	0.7				
K50026		KPT40-5	0.33 - 1.1	68.9	180	300	2000	84.1	79.2	55.5	10.3	4.3				
K50551		KPT40-7	0.17 - 1	78.9	200	2600	14000	74.1	46.3	28.6	11.1	0.7				
K51217		KPT41-2	0.17 - 0.58	98.9	1500	9000	27000	51.1	17.9	7.4	1.8	0.5				
K51208		KPT42-2	0.17 - 1	85.9	150	800	7500	88.7	61.2	39.1	10.8	2.1				
K51190		KPT42-3	0.17 - 0.76	89.5	200	1000	11000	80.6	56.9	37.2	8.4	1				
K51203		KPT43-3	0.17 - 0.92	95.5	1200	4400	9000	87.5	20.4	10.6	2.8	0.5				
K51192		KPT44-3	0.17 - 0.67	78.9	4.5	17	50	100	97.4	95.9	94.2	20.6				
K51108		KPT46-6	0.17 - 1	91.1	425	2000	5000	96.7	50.6	15.9	6.7	0.3				
K51161	K51162	KPT47-1	0.17 - 1.17	53.1	80	200	310	100	99.7	95.2	14.8	4.8				
K51149		KPT49-1	0.17 - 1	70.8	180	300	550	100	98.4	76.2	8.2	3.2				
K51188		KPT49-4	0.17 - 1	95.9	83.7	3200	9000	83.7	37.8	11.2	4.1	0.2				
K50793		KPT50-6	0.17 - 1	61.4	22	1200	11000	81.3	55.5	39.4	21.4	10.3				
K51164		KPT51-2	0.17 - 1	87.2	175	570	6500	88.2	69.6	44.2	7.7	4.5				
K50660		KPT52-1	0.17 - 1	85.1	150	400	3100	98.7	74.7	53.5	12.5	4.3				
K50696		KPT53-2	0.17 - 0.92	85.4	190	280	410	100	95.6	86.6	3.3	0.9				
K50677		KPT53-3	0.17 - 1	86.3	300	700	3200	95.8	73.9	29.5	3.8	0.7				
K50514		KPT53-5	0 - 0.17	78.6	65	460	14000	76	69.2	47.8	17.1	3.2				
K50028		KPT54-3	0 - 0.5	88.1	60	700	7000	74.8	74.5	38.4	23.1	0.9				
K50727		KPT54-6	0.17 - 1	78.2	190	550	4750	87.7	83.3	46.8	5.3	1.7				
K50694		KPT56-2	0.17 - 0.5	79.7	225	380	3000	87.5	82.2	57.5	3.5	1.5				
K50705		KPT56-6	0.17 - 0.58	88.4	4800	12500	18000	35.6	11.2	11.2	11.2					
K50612		KPT56-7	0.17 - 1.08	73.9	170	700	18000	79.2	57.8	44.5	9.2	4				
K50512		KPT57-1	0 - 0.17	92	240	2000	8500	88.3	49.6	27.9	3.9	0.9				
K50767		KPT57-7	0.17 - 0.5	94.4	1200	2800	4100	100	22	9.9	7	1.8				
K50703		KPT58-4	0.17 - 0.67	70.9	17	350	3800	97.3	74.3	55	29	10				
K50692		KPT58-6	0.17 - 0.5	73.8	165	450	4000	98	69	49.3	5.2	1.1				

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sample ID	Duplicate ID	Location	Depth Increment (ft)	% Solids	Percentile Sizes (μm)			Percent finer than				
					16%	50%	84%	Gravel	#10 Sieve	#40 Sieve	#200 Sieve	Sum
K50461		KPT58-7	0.17 - 0.67	81.3	160	425	5000	82.9	64.2	50.5	7.3	3
K51141		KPT59-1	0.17 - 0.83	86.8	200	410	2000	100	83.1	51.3	5.4	0.8
K50542		KPT59-2	0.17 - 0.67	87.1	70	5500	16000	66.3	28	20.8	17.9	0.2
K51372		KPT59-4	0.17 - 0.83	86.7	400	1000	4000	96.5	70.2	17.3	4.3	0.9
K51075		KPT59-8	0.17 - 1.08	62.1	22	350	4000	100	66.3	52.6	28.9	9.3
K50361		KPT60-8	0.17 - 1	83.8	350	2000	7000	81.8	51.4	17.1	10.1	4
K50030		KPT61-2	0 - 0.5	80.8	370	2800	19000	60.3	44.8	18.3	1.2	0.9
K51441		KPT61-6	0.17 - 0.5	91.2	900	4500	13000	73.5	23.2	11.3	4.4	0.4
K51205		KPT61-8	0.17 - 1	82.6	280	1800	11000	80.7	51.8	31.6	3.5	1
K51173		KPT62-1	0.17 - 0.5	53.2	6	220	700	100	92.4	76.5	41.9	17
K50344		KPT62-7	0.17 - 0.67	64.2	20	195	380	99.5	98.4	88.5	21.2	11.7
K50283		KPT63-1	0.17 - 1	89.2	250	425	1000	94.9	90.5	50.2	5.7	1.1
K50301		KPT63-2	0.17 - 0.92	84.6	300	720	1900	98.5	85	25.3	8.9	1.5
K50642		KPT64-1	0.17 - 1	45.4	0.5	5.5	27	100	100	99.7	97.8	51.5
K50217		KPT64-6	0.17 - 1	58	2	75	280	100	98.9	94.4	49.8	25.5
K50639		KPT65-1	0.17 - 1	50.7	1.5	16	180	100	100	96.7	72.3	33.8
K50516		KPT65-3	0 - 0.17	69.4	23	470	1500	99	92.2	47.9	23.3	6.4
K50590	K50592	KPT65-5	0.17 - 1	31	2	30	120	100	100	96.9	81.4	29.8
K50529		KPT65-6	0.17 - 1	66.3	3.8	180	2800	100	76.3	65.5	40.4	19.5
K50713		KPT66-1	0.17 - 1	44.1	1.75	11	53	100	100	97.1	91.1	28.6
K50597		KPT66-2	0.17 - 1	43.5	2.6	15	40	100	99.9	99.1	95	28.2
K50521		KPT66-3	0.17 - 1	44.9	1	7.3	55	100	100	98.7	91.4	45.8
K50634		KPT66-4	0.17 - 1	41.8	0.5	6.6	44	100	100	99.2	96.3	45.4
K50544		KPT66-5	0.17 - 1	42.2	1	5.8	30	100	100	99.6	82.6	50.5
K50871		KPT66-6	0.17 - 1	59.8	4.8	470	3300	93	73.9	49.3	43.6	19
K50960		KPT66-7	0.17 - 1	41.6	1.9	11	40	100	100	99.3	95.1	30.8
K50510		KPT67-3	1 - 2.08	44.8	3.2	25	67	100	98.7	96.4	88.7	25.7
K50537		KPT67-5	0.17 - 1	45.3	1	6.6	37	100	99.9	99.3	97.1	46.7
K50656		KPT67-6	0.17 - 1	40	0.5	6.5	32	100	99.9	99.1	96.1	45.4
K50557		KPT68-2	0.17 - 0.75	89.9	470	1750	13000	81.3	53.9	13.1	1.3	0.3
K50498		KPT68-3	0.17 - 1	26.6	520	1400	3000	100	69.8	9.4	5.9	0.3
K50032		KPT68-4	0 - 0.5	61.8	15	1500	13500	60.1	52.6	41.4	27.8	8.2
K50519		KPT69-3	0.17 - 1	93.9	850	3100	9500	84.5	29.9	8.7	3	0.7
K50534		KPT69-5	0.17 - 1	87.3	340	700	2600	98.3	80.5	25.3	3.1	0.2
K50508		KPT69-7	0.17 - 1	87.6	290	1750	14000	79.2	52.6	29.3	2.5	1.1
K51303		KPT69-8	0.17 - 0.58	83.5	240	5200	14000	66.2	36.5	22.2	11	3.8
K51083		KPT70-2	0.17 - 1	55	55	240	850	93.8	87.3	74.7	18.5	2.9
K51342		KPT70-4	0.17 - 0.5	89.1	300	2500	1000	82.6	45.7	26.9	3.9	1.3
K51147		KPT70-5	0.17 - 1	90.3	320	900	3000	95.6	67.9	29.3	3.3	0.2
K50969		KPT70-6	0.17 - 1	55.1	36	300	2200	96.7	82.7	63.9	21.9	7.4
K51044		KPT70-8	0.17 - 1	95.1	420	3600	11000	80.9	36.2	16	4.1	0.6
K51139		KPT71-4	0.17 - 1	85.3	290	1500	9000	85	53.7	29	4.6	0.6
K50318		KPT72-3	0.17 - 1	91.4	450	1500	3800	94	59.6	14.4	4.9	0
K50347		KPT72-4	0.17 - 1	59.4	6	150	700	94.1	90.1	78.9	40.8	17.2
K50335		KPT72-6	0.17 - 1	93.7	65	2300	4300	89	43.9	27.7	18	3.7
K51048		KPT72-7	0.17 - 1	88.1	350	850	1600	100	93.9	17.5	10.7	0.6
K51077		KPT73-1	0.17 - 1.17	29.2	5	40	170	100	100	95	74.3	19.5
K50038		KPT73-2	0 - 0.33	95.1	140	350	2000	97.6	84.5	55.6	5.8	3.7
K50039		KPT73-2	0.33 - 4.4	77.8	140	300	1500	91.6	86.3	68.8	10.3	4.5
K51143		KPT73-4	0.17 - 1	59.2	17	80	210	100	98.9	94.8	46.4	8.4
K51057		KPT73-5	0.17 - 1	43.2	4.5	35	100	100	97.5	77.7	20.6	
K51063		KPT74-2	0.17 - 1	34.8	5	60	1100	100	99.9	71.9	54	18

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sampled ID	Duplicate ID	Location	Depth Increment (ft)	% Solids	Percentile Sizes (μm)			Percent finer than				
					15%	50%	84%	Gravel	Sieve #10	Sieve #40A	Sieve #200	Sieve 5 μm
K50320		KPT74-4	0.17 - 1	39.1	0.8	8	65	100	98.8	95.5	87	45.2
K50760		KPT74-6	0.17 - 1	87.5	520	1500	3800	96.4	64.5	9.5	1.8	1.3
K50209		KPT75-2	0.17 - 1	41.2	3	60	230	100	100	94.5	54.1	20.1
K51105		KPT76-3	0.17 - 1	15.5	18	160	1300	100	100	58	48.5	4.6
K51101		KPT76-5	0.17 - 1	24.9	30	130	650	100	99.6	74.6	45.3	3.4
K50255		KPT77-1	0.17 - 1	38.6	1.3	15	70	100	100	98.5	86	35.7
K50243		KPT77-3	0.17 - 1	33.1	0.5	5.5	42	100	100	99.1	93.6	50.9
K50825		KPT77-8	0.17 - 1	86.6	200	350	700	100	97.5	68.5	2.7	0.7
K50879		KPT78-6	0.17 - 1	74.5	40	180	230	100	99.5	98.5	21.9	9.1
K50907		KPT79-4	0.17 - 1	72.9	40	225	375	100	99.3	93.1	20.3	6.2
K50045		KPT79-5	0 - 0.33	41	6	40	180	100	100	95.3	71.6	18
K50046		KPT79-5	0.33 - 3.1	71	85	200	350	100	100	96.8	13.3	3.9
K50364		KPT79-6	0.17 - 1	43.5	1.3	10	90	100	99.9	99.3	81.4	38
K51098		KPT79-7	0.17 - 0.67	48.8	44	400	3500	95	77.5	51.6	19.8	6.2
K51053		KPT80-2	0.17 - 0.42	96.9	850	6700	14000	64.7	20.2	11.3	3.1	0.2
K51046		KPT81-5	0.17 - 0.58	97	420	4700	15000	64.4	32.4	15.5	2.5	0.6
K51091		KPT82-4	0.17 - 1	91.8	620	2900	9000	84.1	41.8	8.5	3.2	0.3
K51019		KPT82-6	0.17 - 0.75	88.2	210	660	14000	73.4	59.8	43.5	7.2	1
K51042		KPT82-7	0.17 - 0.5	84.1	320	750	1800	100	87.7	26	3.2	0.4
K51055		KPT82-8	0.17 - 0.67	37.5	55	170	280	100	97.6	92.8	24.4	3.2
K50191		KPT85-6	0.17 - 1	84	140	360	1900	92.6	85.3	58.5	10.8	4.8
K51073		KPT86-1	0.17 - 0.67	89.7	380	8000	30000	51.5	39.4	19.4	3.9	0.7
K51126		KPT87-6	0.17 - 0.75	66.6	75	200	2000	90.8	83.4	77.3	15.8	4.6
K51040		KPT88-2	0.17 - 1	95.8	65	2100	5000	98.2	47.6	44.4	18.7	0
K51170	K51171	KPT88-3	0.17 - 1	90.8	410	2200	4300	97.4	44.6	16.9	6.7	0.2
K51152		KPT88-7	0.17 - 1.25	63.3	11	175	380	100	97.5	87.3	40.4	11.6
K51439		KPT89-3	0.17 - 1	90.4	360	900	2900	95.4	78.1	20.1	1.1	0.7
K50850		KPT89-6	0.17 - 1	87.5	400	1100	2400	99.2	80.9	16.8	13.6	0.3
K50742		KPT90-1	0.17 - 1	79.2	80	150	225	100	95.9	94.8	12.8	2.9
K50419		KPT90-2	0 - 0.17	87.3	230	1700	8000	68.2	51.4	34.2	6	0.7
K50420		KPT90-2	0.17 - 1	90.8	300	690	2000	97.1	85	30.3	4.4	0.3
K50725		KPT90-3	0.17 - 1	91.9	380	1200	3800	94.6	66.2	19	5.3	0.1
K50357		KPT90-4	0.17 - 1	89.2	260	610	2250	94.4	82.4	37.3	2.6	0.5
K50749	K50751	KPT90-7	0.17 - 1	72.1	160	225	370	97.5	97.3	92.1	8.2	4
K50730	K50732	KPT91-1	0.17 - 1	81.1	93	185	325	98.7	94.7	88.7	9.4	3.1
K51066		KPT91-3	0.17 - 1	89.9	450	1100	2400	99.3	80.8	15.1	2.4	0.3
K51195		KPT91-3	0.17 - 1	92.9	70	1500	3500	100	60.6	23.6	18	0.2
K50053		KPT91-4	0 - 0.33	86.7	490	1200	3000	96.7	74.7	13.1	2.3	0.8
K50054		KPT91-4	0.33 - 5.1	78.5	200	480	1200	99.1	95.4	59.7	10.7	4.3
K50709		KPT91-6	0.17 - 1	81.6	160	300	480	100	99.9	81.2	5.3	1.5
K50788		KPT92-2	0.17 - 0.83	75.1	80	950	1850	100	89.4	23.6	15.5	7.5
K50399		KPT92-3	0.17 - 1.17	90.3	500	1100	2500	99	80	10.3	3.6	0.9
K50410		KPT92-4	0.17 - 1.5	91.3	560	1600	4000	90.1	61.5	8.1	1.1	0.5
K51297		KPT92-7	0.17 - 1	88.7	350	7000	1800	100	89.5	58.3	3.5	0.4
K50986		KPT92-8	0.17 - 1	40	3.8	28	240	100	100	88.8	75.9	21.1
K50999		KPT93-1	0.17 - 1	41.9	1.5	13	70	100	100	95.3	86.5	34.2
K50563		KPT93-3	0.17 - 1	86.6	310	700	1600	99.7	88.3	30.2	3	0.7
K50559		KPT93-5	0.17 - 1	95.3	275	580	1800	98.7	87.4	40.8	3.4	0.3
K50292		KPT94-3	0.17 - 1.17	84.6	225	310	425	99.1	97.7	83.6	2.1	0.7
K50296		KPT94-4	0.17 - 1	76	180	300	425	97.8	96	83.5	4.3	2.3
K50304		KPT94-6	0.17 - 0.833	76.7	150	320	1700	93.6	86.5	63.1	9.1	4
K51210		KPT94-8	0.17 - 1	82.9	170	320	1000	100	90.4	64.9	9.2	2.2

Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

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Sample ID	Location	Depth Increment (ft)	Weight (g)	Percentiles Sizes (in.)			Percentiles (mm)		
				16%	50%	84%	Gravel	Sieve	Sieve
K50718	KPT95-2	0.17 - 0.5	89.5	270	3500	9750	83.4	36.8	19.3
K50720	K50723	KPT95-7	0.17 - 1	83.3	75	210	1000	98.2	86.4
K50736		KPT97-3	0.17 - 0.75	94.9	340	3000	13500	73.6	44.2
K51219		KPT97-4	0.17 - 0.58	91.7	210	1800	15000	76.8	51.7
K50747		KPT98-2	0.17 - 0.92	73.6	0.5	4	2000	95	84.4
K50734		KPT98-3	0.17 - 0.67	99.7	2000	10500	17500	43.9	16.1
K51182		KPT98-4	0.17 - 0.75	95	380	4200	13000	73.2	36.8
K50753		KPT99-1	0.17 - 1	77.1	80	170	240	100	99.9
K51159		KPT100-1	0.17 - 0.92	69	23	85	200	100	97.9
K50701		KPT100-2	0.17 - 1.33	94.4	575	4400	13000	73.6	28.7
K50765		KPT100-3	0.17 - 0.5	89.2	490	3000	17000	71.5	40.8
K50738		KPT100-7	0.17 - 1	80.3	190	290	510	98.9	87.4
K50707		KPT101-2	0.17 - 1.08	86	220	400	5000	93.6	76.8
K50745		KPT102-2	0.17 - 0.92	80.7	240	3200	9600	83.6	42.9
K51117		KPT103-2	0.17 - 0.92	62.8	7	160	600	92	88
K51011		KPT103-3	0.17 - 1	51.8	2.6	50	60	100	100
K50060		KPT103-4	0 - 0.33	60.1	12	180	2000	89	84.7
K50061	K50061	KPT103-4	0.33 - 2.9	80.1	32	900	7000	75.1	61.7
K50062	K50061	KPT103-4	0.33 - 2.9	79.4	42	1400	8000	71.1	56.8
K50864		KPT103-5	0.17 - 1.08	48	2.4	18	250	94.1	85.7
K51261		KPT103-6	0.17 - 1	41.4	2	17	90	100	100
K50117		KPT104-3	0.17 - 1	50	1.6	16	70	100	100
K51235	K51238	KPT104-4	0.17 - 1	51.9	2	17	70	100	100
K51130		KPT104-7	0.17 - 1	85.8	175	400	2000	97.4	83.5
K51214		KPT105-1	0.17 - 1	76	5	70	220	100	96.6
K51266		KPT105-3	0.17 - 0.83	94.2	80	2000	11000	76.7	49
K51086		KPT105-6	0.17 - 1	41.5	2	25	65	100	100
K50915		KPT106-5	0.17 - 1	84.8	210	425	3800	94.4	75
K51250		KPT106-6	0.17 - 1	42	1.8	12	48	100	100
K51270		KPT106-7	0.17 - 1	44.3	2	13	55	100	100
K51427		KPT106-8	0.17 - 1	72.4	13	110	210	100	100
K50894		KPT107-1	0.17 - 1	89.7	160	400	3600	92.1	78.7
K50121		KPT107-2	0.17 - 1	38	0.5	6.5	48	99.7	99.6
K50606		KPT107-3	0.17 - 1	83.3	200	320	800	100	93.3
K50368		KPT107-4	0.17 - 1	76.7	60	195	275	100	100
K50067		KPT107-5	0 - 0.33	83.9	210	450	2900	92.4	78.9
K50068		KPT107-5	0.33 - 2.9	74.3	150	270	650	99.5	97.2
K51221		KPT107-6	0.17 - 1.25	86.5	200	350	11100	100	90.6
K50932		KPT108-3	0.17 - 1	82.1	100	180	370	100	99.6
K50630		KPT108-7	0.17 - 1	50.1	3.5	54	200	100	99.9
K50584		KPT108-8	0.17 - 1	56	2.4	27	140	100	100
K50287		KPT109-1	0.17 - 1	80.9	200	350	1000	99	97.4
K51389		KPT113-2	0.17 - 0.75	94.8	440	5200	15000	65.3	32
K51276		KPT113-5	0.17 - 0.92	98.9	525	7000	18000	59.3	28.8
K51259		KPT113-6	0.17 - 1	93.5	600	4000	9000	83.9	30.2
K51274		KPT114-3	0.17 - 0.5	96.4	900	6500	15000	61.1	25.8
K51278		KPT114-4	0.17 - 1.08	94.2	650	3000	9000	86.5	34.8
K50785		KPT115-1	0.17 - 1	70.2	60	210	3000	99.6	78.3
K50884		KPT115-2	0.17 - 1	83.8	180	370	9000	100	92.8
K50796		KPT115-5	0.17 - 1	87.3	140	500	6000	100	68.1
K50815		KPT115-6	0.17 - 0.83	69.6	27	200	700	100	95.6
K50920		KPT117-1	0.17 - 1.17	82.8	190	600	12000	80.5	65.2

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sample ID	Duplicate ID	Location	Depth (m)	Increment (m)	Solids	(Percentile Size (µm))			Percent finer than				
						10%	50%	90%	Gravel	Sieve 4.75 mm	Sieve 2.00 mm	Sieve 1.00 mm	Sieve 0.50 mm
K50905		KPT117-2	0.17 - 1.08		96.7	850	5700	17000	63.6	25.6	10.6	1.7	0.7
K51442		KPT117-3	0 - 0.17		85.1	220	450	5000	92.5	76.6	48.2	1.1	0.6
K50848		KPT117-6	0.17 - 1.25		95.4	650	8000	24000	54.9	23.9	11.3	0.7	0.3
K50930		KPT118-1	0.17 - 0.92		80.8	140	550	7000	92.6	56.7	48.8	6.7	1.9
K50071		KPT118-3	0 - 0.5		79.3	400	20000	30000	22.4	20.1	16.5	6.9	0.2
K50481		KPT118-7	0.17 - 0.58		94.2	390	7500	20000	39.3	24.5	17.5	4.8	0.3
K51128		KPT119-3	0.17 - 1		90.5	240	400	800	100	93.8	56.1	2	0.2
K50429		KPT119-4	0.17 - 1		83.9	190	350	1600	95.6	86.9	60.8	3.5	0.7
K50153		KPT119-5	0.17 - 1		76.7	82	160	210	100	100	99.7	10.3	3
K51242		KPT119-6	0.17 - 1		50.7	38	100	200	100	100	94.1	35.2	7.3
K51176		KPT119-7	0.17 - 1		37.6	8	35	160	100	100	92.2	74.1	13.6
K51287		KPT119-8	0.17 - 1		33.4	5	33	62	100	100	97.4	87.3	18.6
K50957		KPT120-1	0.17 - 1		80.7	140	210	350	100	98.8	85.9	7.9	1.4
K50996		KPT120-3	0.17 - 0.5		79.1	21	270	12000	76.3	58.7	52.3	31.7	8.3
K50823		KPT120-7	0.17 - 1.25		83.8	225	1600	10000	63.3	53.6	36.7	1.8	0.8
K50247		KPT121-2	0.17 - 1		88.9	295	1700	9500	83.3	69.3	30.1	1.1	0.5
K50937		KPT121-3	0.17 - 1		92.9	350	4750	13000	76	35.5	21.2	2.7	0.7
K51285		KPT121-5	0.17 - 0.67		96	350	11000	20000	42.7	31.1	18.4	2.7	0.3
K50891		KPT121-7	0.17 - 1		51.2	18	83	160	100	100	98.1	44.2	8
K51391		KPT122-2	0.17 - 1		41.5	7	40	70	100	100	96.5	85.5	16.5
K50947		KPT122-3	0.17 - 1		47.1	9	44	110	100	100	98.7	75.4	12.2
K51184		KPT122-4	0.17 - 1		77.5	80	180	320	100	99.6	92.9	13.7	2.5
K50983		KPT123-1	0.17 - 1		44.3	7	55	160	100	100	96.5	59.6	13.8
K50756		KPT123-5	0.17 - 1		81.3	155	215	350	100	99.4	95.6	3.3	2.1
K51008		KPT123-6	0.17 - 1		76.8	100	200	310	100	99.9	98.6	11.2	4.6
K50780		KPT123-7	0.17 - 1		71.3	9	150	240	100	100	98.9	32.7	13.2
K50331		KPT124-3	0.17 - 1		89.9	150	550	9000	73.1	62.3	46.4	12.3	4.3
K51232		KPT124-4	0.17 - 1		88.2	170	310	600	87.5	76.2	64.6	5	0.6
K50856		KPT124-5	0.17 - 1		89.4	275	1100	3800	100	66.8	31.1	4.6	0.7
K50912		KPT124-6	0.17 - 1		85.3	190	360	20000	73.2	67.1	57.8	4.5	0.7
K50374		KPT124-7	0.17 - 1		84.6	100	450	4700	84.9	74	48.6	13.5	2.6
K50819		KPT125-6	0.17 - 1		86.7	280	400	800	100	96.6	55.2	2.3	0.7
K50804		KPT125-7	0.17 - 1		86.5	400	2100	5000	97.9	47.2	17.3	5.9	0.9
K50806		KPT125-7	0.17 - 1		83.1	260	360	600	100	99.9	70.2	1.9	0.5
K51061		KPT126-1	0.17 - 1.25		91.9	380	5200	14000	71.6	31.7	19.1	3.1	0
K51110		KPT126-2	0.17 - 1		91.5	225	750	14000	77.3	56.4	45.8	6.4	0.7
K50269		KPT126-5	0.17 - 1		88.4	290	550	1400	99.5	95.1	36.9	6.1	0.7
K50492		KPT126-7	0.17 - 1		87.5	330	1350	4000	97.9	60.9	23	4.3	0.3
K50928		KPT127-2	0.17 - 0.67		80.2	180	640	6800	90	68.2	42.9	4.7	1
K50987		KPT127-3	0.17 - 0.75		85.9	270	420	1400	100	91	51.4	1.2	0.5
K50939		KPT127-5	0.17 - 1		87.3	270	420	900	100	95.5	52.2	2.1	0.6
K51137		KPT127-7	0.17 - 0.5		86.7	280	600	1700	98.6	87.5	34.1	2.9	0.9
K50774		KPT128-3	0.17 - 1		87	255	390	800	100	95.9	58	4.4	1.3
K50074		KPT128-4	0 - 0.33		80.7	350	650	1500	99.3	94.5	21.9	3.9	0.8
K50075		KPT128-4	0.33 - 0.9		85.7	300	780	3200	68	79	24.4	4.4	0.5
K50955		KPT128-6	0.17 - 0.58		97.2	1300	7000	16000	64.2	17.8	11.9	2.3	0.3
K51329	K51330	KPT128-6	0.17 - 0.83		89.3	150	2000	12000	77.5	49.3	30.1	13.8	0.2
K50839		KPT129-4	0.17 - 1		85.5	200	280	380	100	99.9	96.6	1.8	0.7
K51353		KPT129-6	0.17 - 0.75		91.5	550	3000	12000	78.3	40.8	10.8	2.1	0.6
K50422		KPT129-8	0.17 - 1		85.3	190	350	600	80.6	71.9	59.6	3.2	0.8
K50314		KPT130-1	0.17 - 1		78.1	80	170	220	100	100	99.9	15	6.1
K51154		KPT130-5	0.17 - 1		85.4	330	700	2900	95.9	78.3	27.8	1.9	0.6

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Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

Sample ID	Duplicate ID	Location	Depth Increment (ft)	% Solids	Percentile Sizes (μm)			Percent finer than				
					16%	50%	84%	Gravel	#10 Sieve	#40A Sieve	#20B Sieve	53um
K50133		KPT131-3	0.17 - 1	91.9	260	480	1600	97.9	90.2	46	2.4	1
K50329		KPT131-4	0.17 - 1	92.9	180	700	2600	96.4	79.7	31.9	13.5	2.9
K50683		KPT132-1	0.17 - 1	90	95	260	4000	93.6	77.2	64.5	11.7	2.9
K50776		KPT132-2	0.17 - 0.75	90.3	290	2250	15000	72	47.6	27.4	2.4	1.7
K50616		KPT132-7	0.17 - 1	87.3	310	650	1750	97.8	87.7	29.2	3.8	0.8
K50186		KPT133-1	0.17 - 1	37	2	30	85	100	100	98.5	81.5	26.7
K50171		KPT134-3	0.17 - 1	40.8	1.8	38	70	100	100	98.6	86.1	29
K50125		KPT134-7	0.17 - 1	55.2	20	125	210	100	100	97.7	27.4	11.6
K50081		KPT135-2	0 - 0.33	36.1	2.5	38	120	100	100	98.5	70	23.2
K50082		KPT135-2	0.33 - 4.1	50.9	1.5	20	150	100	100	99.5	67.2	31.1
K50167		KPT135-7	0.17 - 1	39.9	2.2	38	180	100	100	92.4	69.8	26.5
K50220		KPT136-6	0.17 - 1	41.5	0.5	11	65	100	100	99.2	89.1	39
K50621		KPT136-8	0.17 - 1	37.2	7.2	40	100	100	100	95.4	80.6	13.8
K50866		KPT137-5	0.17 - 1	41.9	2.4	19	90	100	100	98.4	86.1	28.8
K51021		KPT137-8	0.17 - 1	37	3.9	20	60	100	100	99	91.6	22.1
K50129		KPT138-5	0.17 - 1	84.9	200	275	400	100	99.7	92.1	1.3	1.2
K50501		KPT139-1	0.17 - 1	84.4	250	540	10000	82.9	69	43.8	4.1	2.7
K50205		KPT139-7	0.17 - 1	66.3	75	180	240	100	100	98.2	15.8	5.7
K50395		KPT142-1	0.17 - 0.5	58	7	65	225	100	100	97.1	53.6	14.7
K50164		KPT142-7	0.17 - 1	56.6	8	95	190	99.8	99.5	98.6	39.4	13.6
K50250		KPT143-1	0.17 - 1	70.4	13	75	140	100	100	99.4	51	10.5
K50227		KPT143-6	0.17 - 1	51.8	1.4	25	66	100	100	98.8	89	30.7
K50181		KPT145-3	0.17 - 1	76.8	70	240	425	100	99.8	84.2	17.2	5
K50448		KPT146-1	0.17 - 1	52	8	70	150	100	100	96.3	51.3	13.9
K50086		KPT146-2	0 - 0.33	54.8	4.5	58	150	100	100	99.8	57.2	18.9
K50087		KPT146-2	0.33 - 2.1	72	2.2	45	140	100	100	100	60.9	25.3
K51035		KPT146-6	0.17 - 1	80.9	100	300	1100	100	90.5	68.1	13.7	3.5
K50886		KPT147-7	0.17 - 1	77.1	10	88	185	100	100	98.8	43	12.4
K50238		KPT147-8	0.17 - 1.17	48.4	1.4	16	75	100	100	99.6	83	37.1
K50973		KPT148-1	0.17 - 1	69.4	8.7	78	175	100	100	97.7	49	13.3
K51026		KPT148-2	0.17 - 1	39.9	4.7	40	110	100	99.9	99.3	75.6	18.7
K51422		KPT149-6	0.17 - 1	50.3	9	50	125	100	100	98.8	65.1	11.9
K50950		KPT149-8	0.17 - 1	48.7	8.5	46	110	100	100	98.4	74.4	12.2
K50231		KPT150-2	0.17 - 1.5	38.7	1	11	100	100	100	99.4	76.4	38.5
K50259		KPT15-3	0.17 - 1.17	74.3	3	43	135	100	100	99.8	65.9	20.9
K50094		KPT150-4	0 - 0.33	63.6	15	95	210	100	100	99.3	38.4	10.5
K50095	K50096	KPT150-4	0.33 - 4.2	69.9	25	170	420	98.8	98.3	84.3	23.3	9
K50096	K50095	KPT150-4	0.33 - 4.2	71.1	29	160	410	99.8	99.4	84.7	22.4	7.9
K51030		KPT150-7	0.17 - 1	72	85	180	310	100	100	93.2	9.6	3.9
K50835		KPT150-8	0.17 - 1	83.1	130	220	380	100	98.4	89.8	4.2	1.5
K50156		KPT151-1	0.17 - 1	81.6	200	350	750	100	96.4	64.2	2.4	1.6
K50176		KPT151-5	0.17 - 1	50.9	2	35	110	100	100	99.4	72.2	27.7
K50340		KPT152-5	0.17 - 1	40.8	1	20	60	100	100	99.5	91.8	30.9
K50135		KPT153-3	0.17 - 1	35.3	2	10	30	100	100	99.8	99.2	31.5
K50325		KPT153-4	0.17 - 1	35.2	0.5	8.5	35	100	100	98.9	98	38.9
K50102		KPT153-6	0 - 0.33	35.3	3.3	16	55	100	100	100	97.2	28.2
K50103	K50105	KPT153-6	0.33 - 4.1	66.5	3.2	55	160	100	100	99.5	55.6	21.3
K50105	K50103	KPT153-6	0.33 - 4.1	67.4	3.2	55	160	100	99.3	98.9	56.4	21.3
K50213		KPT155-4	0.17 - 1	69.3	6	85	185	100	100	99.7	44.7	15.8
K50224		KPT155-5	0.17 - 1	50.6	5	75	150	100	99.9	99.7	48.6	19
K50391		KPT156-1	0.17 - 1	85	180	260	380	100	99.9	95.6	1	0.5
K51228		KPT156-8	0.17 - 1	80.7	75	190	460	100	98	82.2	16.9	4

Table 1
Kalamazoo River Phase II Sediment Sampling
Particle Size Analysis Results

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Sample ID	Duplicate ID	Location	Depth Increment	% Solids	Relative Sieve Sizes (mm)			Particle Size Analysis		
					16%	50%	100%	Gravel Sieve	100% Sieve	200% Sieve
K50580		KPT157-1	0.17 - 1	61.9	90	220	350	100	100	94
K50799		KPT157-2	0.17 - 1	30.1	2	11	45	100	100	97.9
K50810		KPT157-6	0.17 - 1	41.4	2.3	16	60	100	100	99.8
K51290		KPT158-1	0.17 - 1.42	84.5	180	240	370	100	100	96.7
K50112		KPT158-2	0.33 - 3.7	28.9	0.8	7.5	48	100	100	96.3
K51380		KPT158-4	0.17 - 1	36.2	1.5	12	60	100	100	97.9
K51403		KPT158-5	0.17 - 1	51.1	3	35	110	100	100	98.9
K50352		KPT158-7	0.17 - 1	34.9	0.5	7	30	100	100	99.9
K51280		KPT158-7	0.17 - 1	32.9	2	8.5	27	100	100	98.6
K50377		KPT159-1	0.17 - 1	73.3	53	215	580	99.4	97.1	77.8
K50485		KPT159-5	0.17 - 1	35.4	1	5	17	100	100	98.7
K50141		PPT1-1	0.33 - 1	60.2	2.2	16	350	93.3	92	86.1
K50685		PPT1-2	0.17 - 1	84.9	190	480	3000	99.1	79.1	46.5
K50601		PPT1-3	0.17 - 1.33	85.1	250	700	13500	81.6	68.3	34.3
K50476		PPT1-4	0.17 - 1	69.2	7	320	7000	80.2	75.3	57.4
K50942		PPT2-1	0.17 - 1	76.6	190	300	600	99.3	95.8	76.2
K50896		PPT2-2	0.17 - 1	83.6	260	570	1750	100	88.7	29.5
K50483		PPT2-4	0.17 - 0.5	47.9	3	45	300	92.8	92.8	88.4
K50991		PPT3-1	0.17 - 1	70.8	40	230	2700	98.3	80.6	58.1
K51312		PPT3-2	0.17 - 1	87.2	290	1400	11000	82.3	54.1	29.7
K50457		PPT3-3	0.17 - 0.67	72.8	40	225	700	89.2	84	73.8
K51135		PPT4-1	0.17 - 1	81.6	175	320	800	100	94	64.7
K50275		PPT4-2	0.17 - 1	82.3	210	470	2000	93.1	83.9	47.3
K51268		PPT4-3	0.17 - 1	74.4	9	180	900	100	87.9	75.2
K50901		PPT5-1	0.17 - 1	83	60	360	2900	98.1	81	56
K50382		PPT5-2	0.17 - 1	79.6	170	380	3000	86.2	82.4	54.9
K50405		PPT5-3	0.17 - 1	74.3	150	330	1100	98.3	93.5	62.7
K50833		PPT5-4	0.17 - 1	82	220	720	8500	86.2	63.3	37.7
K50980	K50981	PPT6-1	0.17 - 1.25	72.9	80	230	2300	94.3	83.7	72.7
K51121		PPT6-2	0.17 - 1	82.4	180	300	580	99.6	95.8	75.6
K50663		PPT6-3	0.17 - 1	82.7	250	500	1400	97.7	92.1	43.1
K51433	K51435	PPT7-1	0.17 - 1	74.9	60	320	800	96.6	91.5	64.1
K50626		PPT7-2	0.17 - 1	74.5	100	265	675	100	95.4	73.5
K51412		PPT7-3	0.17 - 0.5	70.5	180	350	1100	99.2	90.6	57.9
K50860		PPT7-4	0.17 - 1	84.4	215	400	1450	98.9	89.6	54.9
K50234		PPT8-1	0.17 - 1	86.4	160	800	8000	78.1	63	40.6
K51406		PPT8-2	0.17 - 1.17	84.1	250	430	1400	98.5	89.8	49.8
K51397		PPT8-3	0.17 - 1	76.5	140	220	500	100	88.8	82.6
K50196		PPT9-1	0.17 - 1	85.2	210	525	6000	81.6	73.4	44.1
K50148		PPT9-2	0.17 - 1	86.9	260	650	2800	94.1	78.8	35.2
K50264		PPT9-3	0.17 - 0.58	75.1	33	350	5500	82.4	77.2	57.1
K50161		PPT10-1	0.17 - 0.83	78.1	10	250	3500	88.4	76.4	62.3
K50386		PPT10-2	0.17 - 0.5	74.9	30	700	9500	72.9	61	44.6
K50201		PPT11-1	0.17 - 1	70.6	4	220	14000	67.5	62.6	55.3
K50272	K50273	PPT11-2	0.17 - 1	88.5	270	900	6800	74.7	58.9	35.4
K51336		PPT11-3	0.17 - 0.58	81.1	200	1600	7000	92.6	53.4	34.4
K51437		PPT12-3	0.17 - 1	81.9	60	200	400	100	98.4	85.8
K51115		PPT13-1	0.17 - 0.92	92.8	130	525	6500	92.4	63.6	47.2
K51374		PPT14-1	0.17 - 0.5	89.3	150	600	6600	90	65.8	43.8
K50698	K50699	PPT14-3	0.17 - 0.92	81	110	220	390	100	98.2	89.1
K50506		PPT15-2	0.17 - 1	87.4	380	1500	6250	92.7	64.8	17.5
K51322		PPT15-3	0.17 - 0.5	52.6	1.5	7	140	100	99.8	95.7

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Table 2
Summary of Particle Size Data For Disputed Cores

Sample ID	Core ID	Location	Classification	Rating	Sample (in)	Sample (in)	% Solids	10%	50%	75%	90%	F0 Sieve	#40 Sieve	#200 Sieve	#500 Sieve
K50452		KPT3-6	FINE	2.5	0.17	1	84.9	420	2500	6200	76.2	43.2	16.4	5.3	0.7
K50426		KPT4-1	FINE	2	0.17	1	88.2	230	850	14000	67.6	57.6	39.7	3.1	0.7
K50463		KPT4-5	FINE	2	0.17	1	93.4	425	4750	12000	50.2	32.3	16	5.2	0.3
K50548		KPT4-6	FINE	2.5	0.17	1	89.9	260	2200	7800	91.6	47.7	29.6	2.6	0.6
K51293	K51295	KPT5-1	FINE	3	0.17	1	91.3	500	5800	16000	69.2	27.6	14.6	1.8	0.6
K51315		KPT5-3	FINE	3	0.17	1	79.3	170	300	2500	86.6	83.6	69.7	11.1	4.4
K51332		KPT5-4	FINE	2.5	0.17	0.75	91.7	210	2300	11000	82.7	46.6	28.7	4.6	0.5
K50526		KPT5-8	FINE	4	0.17	1	77.1	95	230	410	100	98.5	88.4	12.8	6
K50434		KPT8-5	FINE	3	0.17	1	89.4	300	2200	8000	66.9	48.5	27.4	3.3	0.7
K50438		KPT8-6	FINE	3.5	0.17	1.08	79	100	170	3000	87	80.7	62.9	11.1	2.4
K50594		KPT12-4	FINE	3	0.17	1	86.2	280	700	4400	94.9	72.3	32.9	3.8	0.6
K50845		KPT17-3	FINE	2.5	0.17	1	87.7	295	1100	8000	87.7	58.7	29	2.2	0.7
K50843		KPT18-3	FINE	2	0.17	1	88.9	600	8600	20000	52.4	24.8	12.5	2.2	0.7
K51006		KPT18-5	FINE	2.5	0.17	0.83	86.9	280	700	6000	90.6	68.6	31.3	4.6	0.6
K51016		KPT19-5	FINE	4	0.17	1	85.4	260	400	900	100	94.2	56.5	2.4	0.2
K51093		KPT20-2	FINE	3	0.17	1.08	89.5	220	800	15000	66.9	56.3	39	1.6	0.3
K50486		KPT24-1	FINE	4	0.17	1	93.6	300	575	1400	97.5	92.6	32.1	3	0.5
K51417		KPT26-5	FINE	3.5	0.17	0.83	75.8	175	420	7000	87.6	66.6	49.7	6.8	3.4
K51350		KPT30-8	FINE	3	0.17	0.5	86.4	300	5000	15000	60.2	38.7	24.4	6.2	1.8
K50573		KPT38-7	FINE	4	0.17	1	77.9	150	400	11000	81.3	68	51.4	6.4	3
K50551		KPT40-7	FINE	3.5	0.17	1	78.9	200	2600	14000	74.1	46.3	28.6	11.1	0.7
K50660		KPT52-1	FINE	3	0.17	1	85.1	150	400	3100	98.7	74.7	53.5	12.5	4.3
K50696		KPT53-2	FINE	3.5	0.17	0.92	85.4	190	280	410	100	95.6	86.6	3.3	0.9
K50677		KPT53-3	FINE	3	0.17	1	86.3	300	700	3200	95.8	73.9	29.5	3.8	0.7
K51141		KPT59-1	FINE	3.5	0.17	0.83	86.8	200	410	2000	100	83.1	51.3	5.4	0.8
K50318		KPT72-3	FINE	2.5	0.17	1	91.4	450	1500	3800	94	59.6	14.4	4.9	0
K50825		KPT77-8	FINE	3.5	0.17	1	86.6	200	350	700	100	97.5	68.5	2.7	0.7
K51019		KPT82-6	FINE	3	0.17	0.75	88.2	210	660	14000	73.4	59.8	43.5	7.2	1
K50742		KPT90-1	FINE	3	0.17	1	79.2	80	150	225	100	95.9	94.8	12.8	2.9
K50730	K50732	KPT91-1	FINE	3.5	0.17	1	81.1	93	185	325	98.7	94.7	88.7	9.4	3.1
K50559		KPT93-5	FINE	3	0.17	1	95.3	275	580	1800	98.7	87.4	40.8	3.4	0.3
K50718		KPT95-2	FINE	3	0.17	0.5	89.5	270	3500	9750	83.4	36.8	19.3	2	0.2
K50734		KPT98-3	FINE	2.5	0.17	0.67	99.7	2000	10500	17500	43.9	16.1	16.1	16.1	16.1
K50429		KPT119-4	FINE	3	0.17	1	83.9	190	350	1800	95.6	86.9	60.8	3.5	0.7
K50823		KPT120-7	FINE	3	0.17	1.25	83.8	225	1600	10000	83.3	53.6	36.7	1.8	0.8
K50756		KPT123-5	FINE	3.5	0.17	1	81.3	155	215	350	100	99.4	95.6	3.3	2.1
K51008		KPT123-6	FINE	3.5	0.17	1	76.8	100	200	310	100	99.9	98.6	11.2	4.6
K50331		KPT124-3	FINE	3.5	0.17	1	89.9	150	550	9000	73.1	62.3	46.4	12.3	4.3
K51232		KPT124-4	FINE	3.5	0.17	1	88.2	170	310	600	87.5	76.2	64.6	5	0.6
K50912		KPT124-6	FINE	3	0.17	1	85.3	190	360	20000	73.2	67.1	57.6	4.5	0.7

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Table 2
Summary of Particle Size Data For Disputed Cores

Sample ID	Duplicate ID	Location	GSSI Classification	BBE Rating	Top of Sample (in)	Bottom of Sample (in)	% Solids	Percentile Sizes (mm)			Percent finer than				
								16%	50%	84%	Gravel	#10 Sieve	#40 Sieve	#200 Sieve	
K50806		KPT125-5	FINE	2.5	0.17	1	83.1	260	360	600	100	99.9	70.2	1.9	0.5
K50819		KPT125-6	FINE	3	0.17	1	86.7	280	400	800	100	96.6	55.2	2.3	0.7
K51110		KPT126-2	FINE	2.5	0.17	1	91.5	225	750	14000	77.3	56.4	45.8	6.4	0.7
K50269		KPT126-5	FINE	3	0.17	1	88.4	290	550	1400	99.5	95.1	36.9	6.1	0.7
K50967		KPT127-3	FINE	3	0.17	0.75	85.9	270	420	1400	100	91	51.4	1.2	0.5
K50939		KPT127-5	FINE	3	0.17	1	87.3	270	420	900	100	95.5	52.2	2.1	0.6
K51137		KPT127-7	FINE	3	0.17	0.5	86.7	280	600	1700	98.6	87.5	34.1	2.9	0.9
K50839		KPT129-4	FINE	3.5	0.17	1	85.5	200	280	380	100	99.9	96.6	1.8	0.7
K50314		KPT130-1	FINE	3.5	0.17	1	78.1	80	170	220	100	100	99.9	15	6.1
K51154		KPT130-5	FINE	2	0.17	1	85.4	330	700	2900	95.9	78.3	27.8	1.9	0.6
K50616		KPT132-7	FINE	3	0.17	1	87.3	310	650	1750	97.8	87.7	29.2	3.8	0.8
K50391		KPT156-1	FINE	4	0.17	1	85	180	260	380	100	99.9	95.6	1	0.5
K50382		PPT5-2	FINE	3	0.17	1	79.6	170	380	3000	86.2	82.4	54.9	6.2	1.7
K51121		PPT6-2	FINE	2.5	0.17	1	82.4	180	300	580	99.6	95.8	75.6	10.3	2

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Table 3. Cores to be replaced.

TRANSECT	LOCATION	RATING	MDNR DISPUTED
3	6	2.5	X
4	1	2	X
4	5	2	X
4	6	2.5	X
5	1	3	X
5	4	2.5	X
6	5	3	X
17	3	2.5	X
18	3	2	X
18	5	2.5	X
26	4	2	
30	8	3	X
57	7	3	
68	2	2.5	
68	3	2.5	
72	3	2.5	X
74	6	3	
82	7	2.5	
91	3	2.5	
92	3	3	
92	4	3	
95	2	3	X
97	4	3	
120	7	3	X
124	5	2.5	
125	7	2.5	
126	2	2.5	X
126	7	3	
130	5	2	X

Figure 1A. Kalamazoo River Sediment Original Classifications

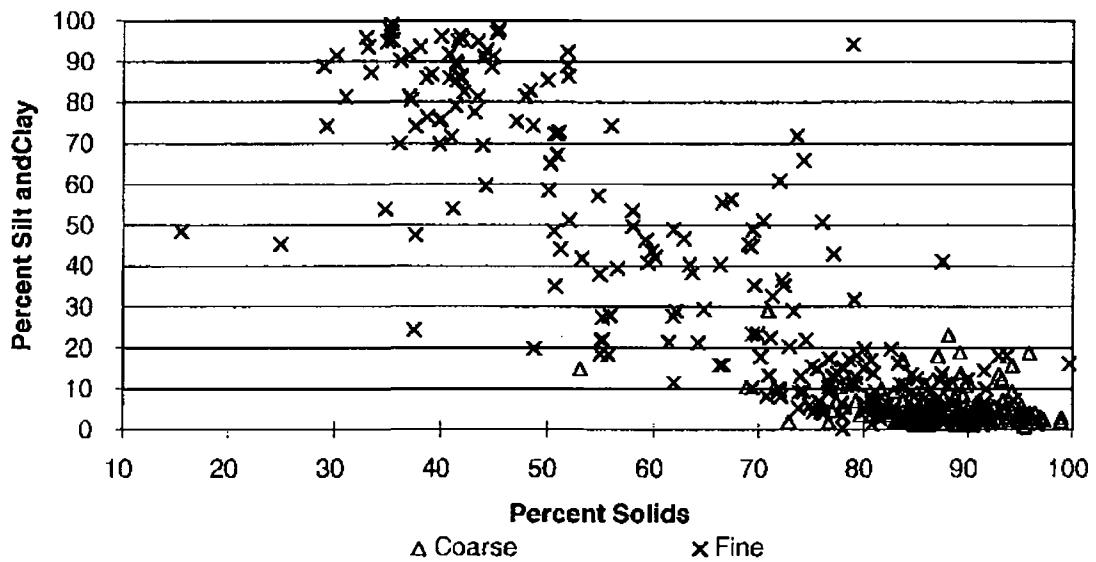
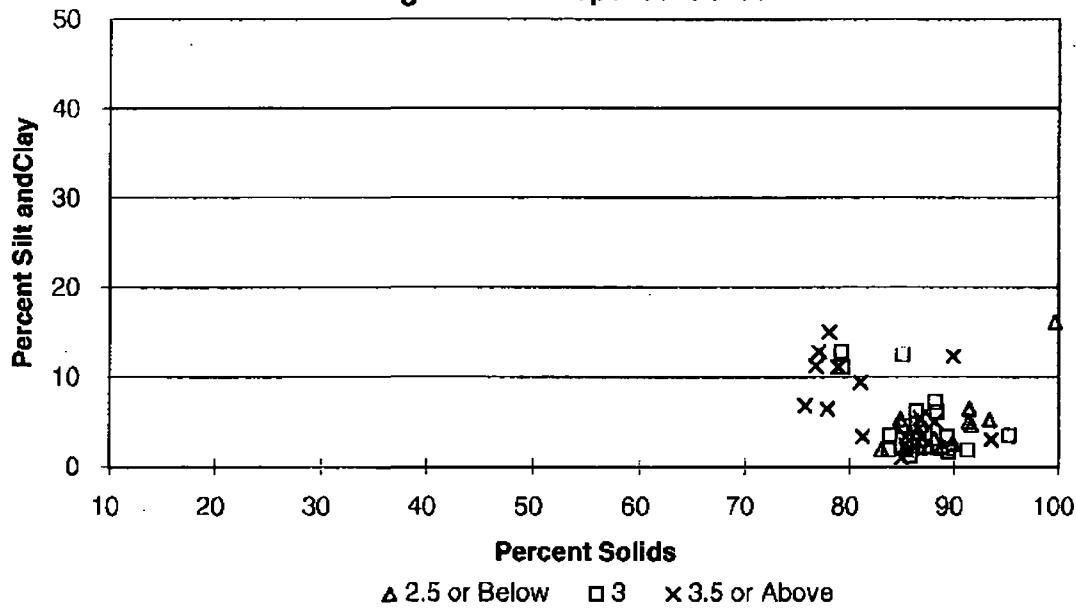


Figure 1B. Disputed Cores



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Figure 2A. Kalamazoo River Sediment Original Classifications

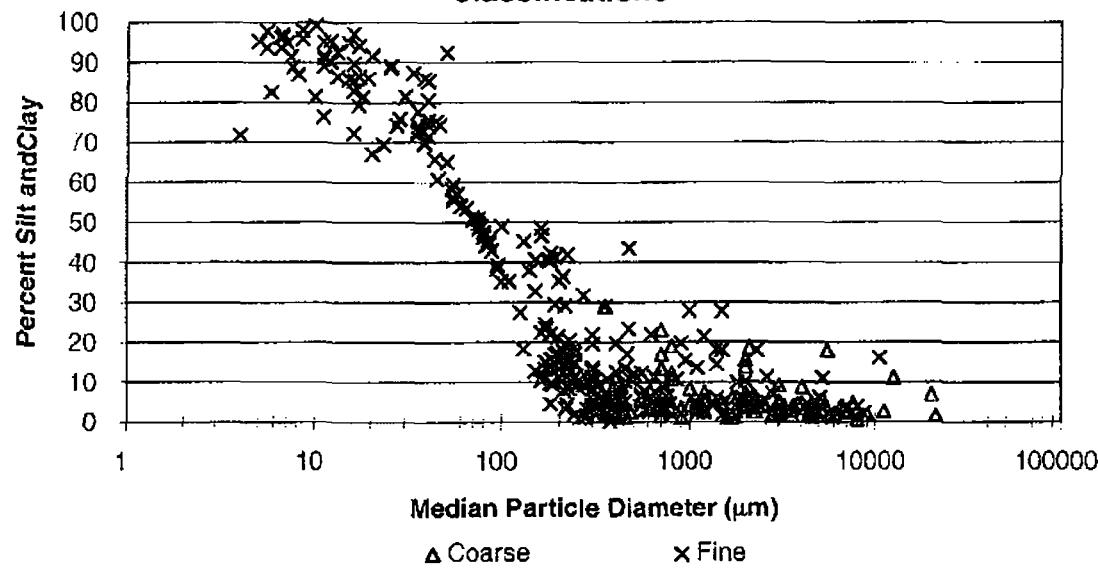
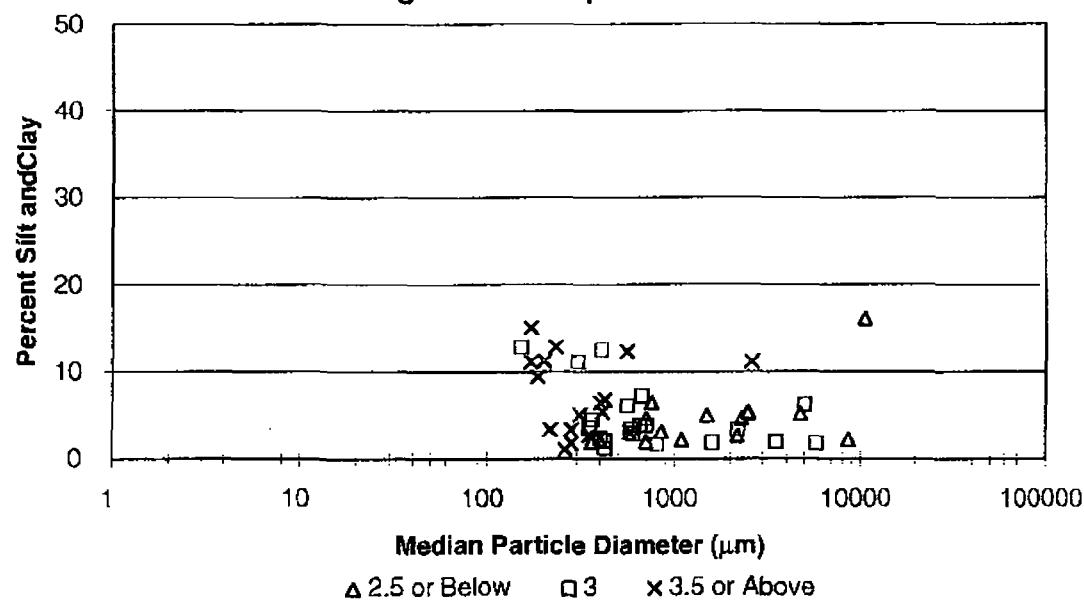


Figure 2B. Disputed Cores



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Figure 3A. Kalamazoo River Sediment Original Classifications

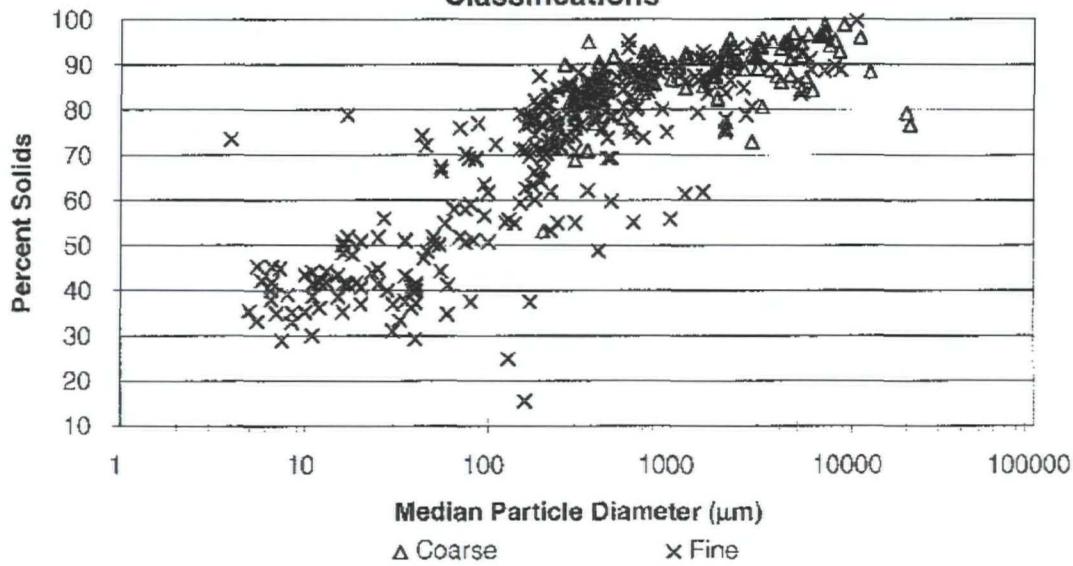
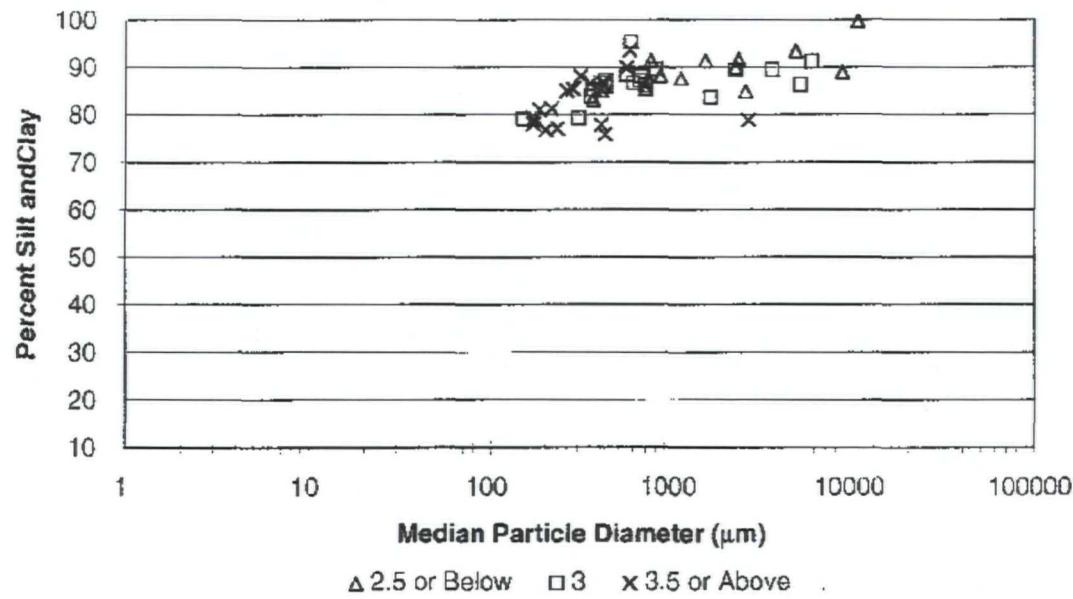
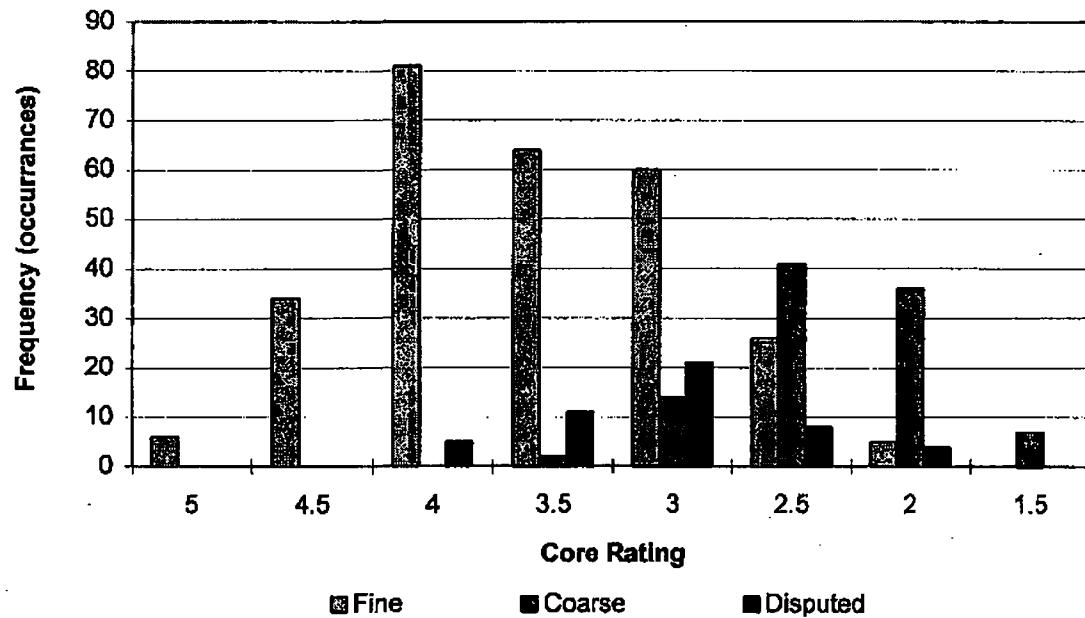


Figure 3B. Disputed Cores



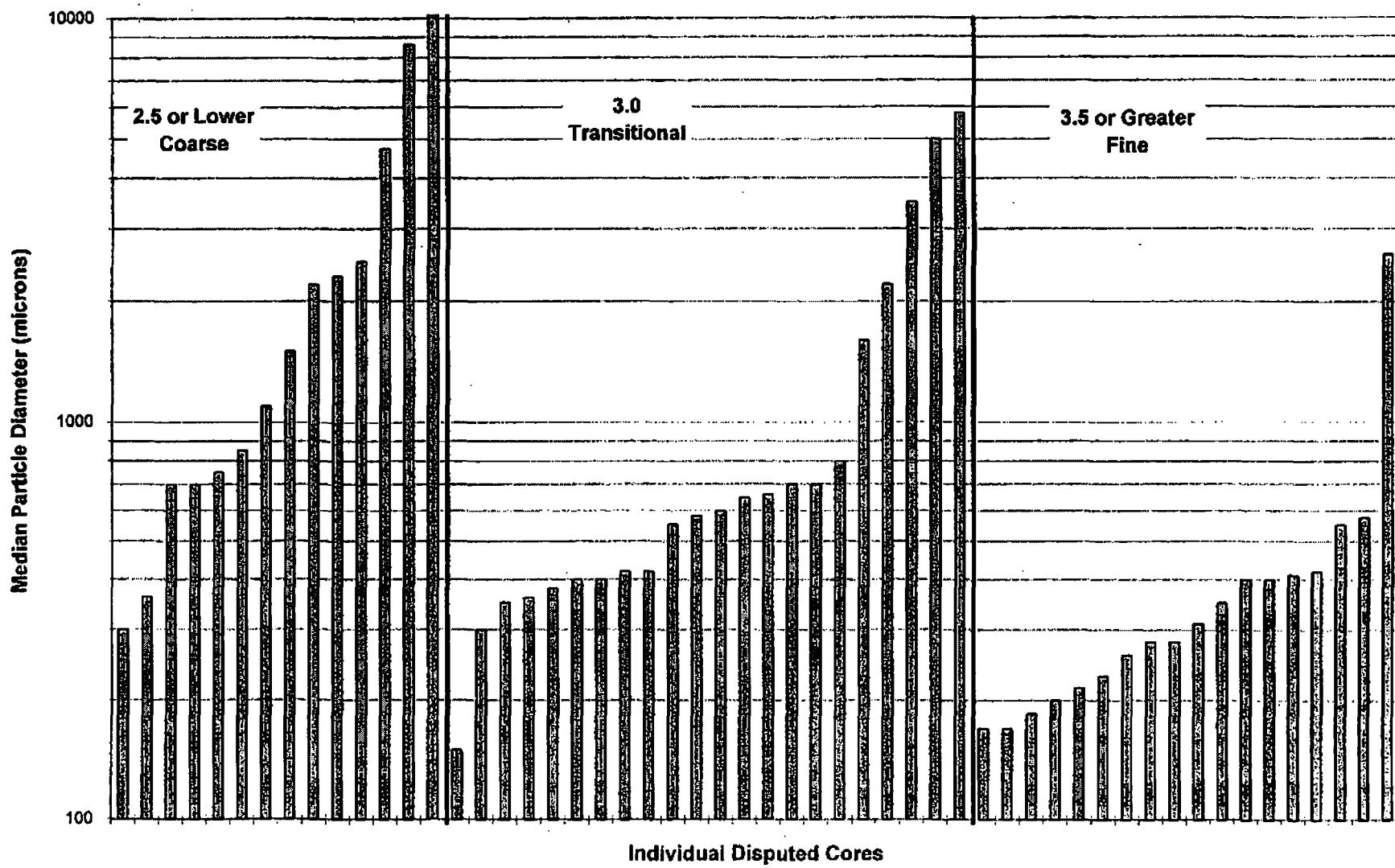
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**Figure 4. Frequency Distribution of Kalamazoo River
Sediment Cores**



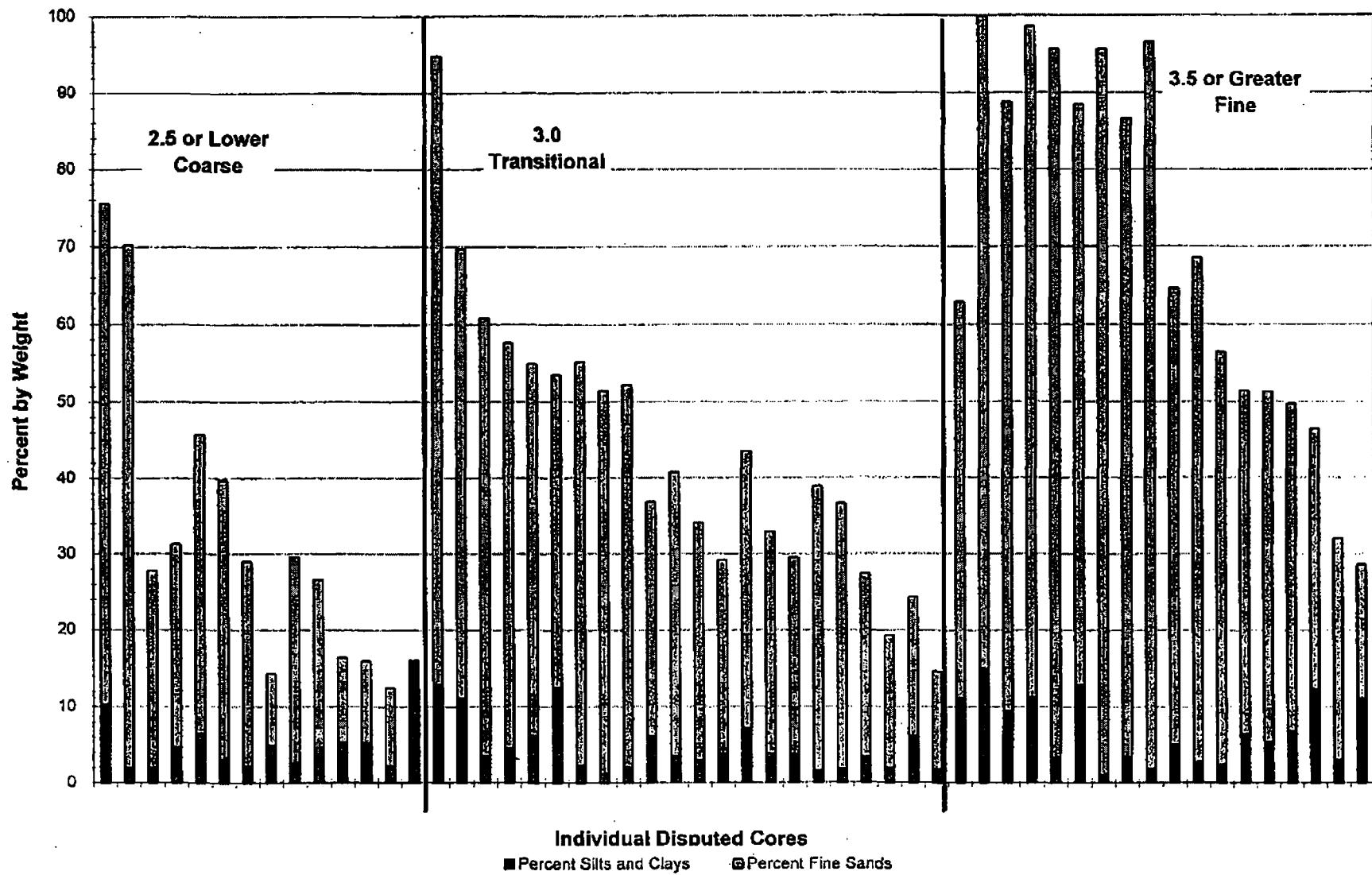
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Figure 5. Median Particle Size by Sediment Classification for the Disputed Cores



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Figure 6. Percent Fine Material by Sediment Classification for the Disputed Cores



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Figure 7. All Cores by New Classification

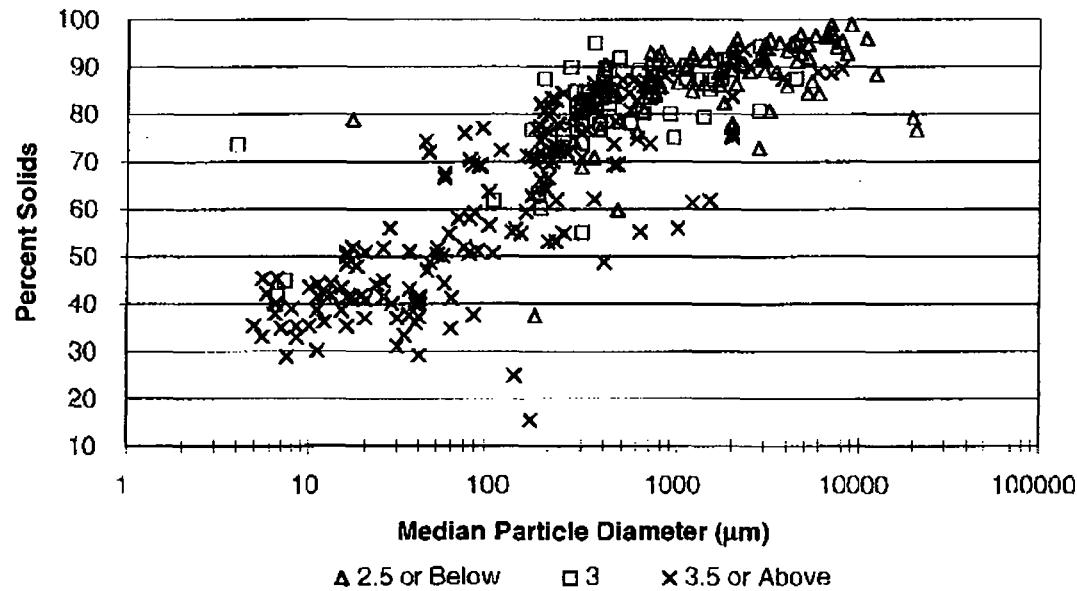
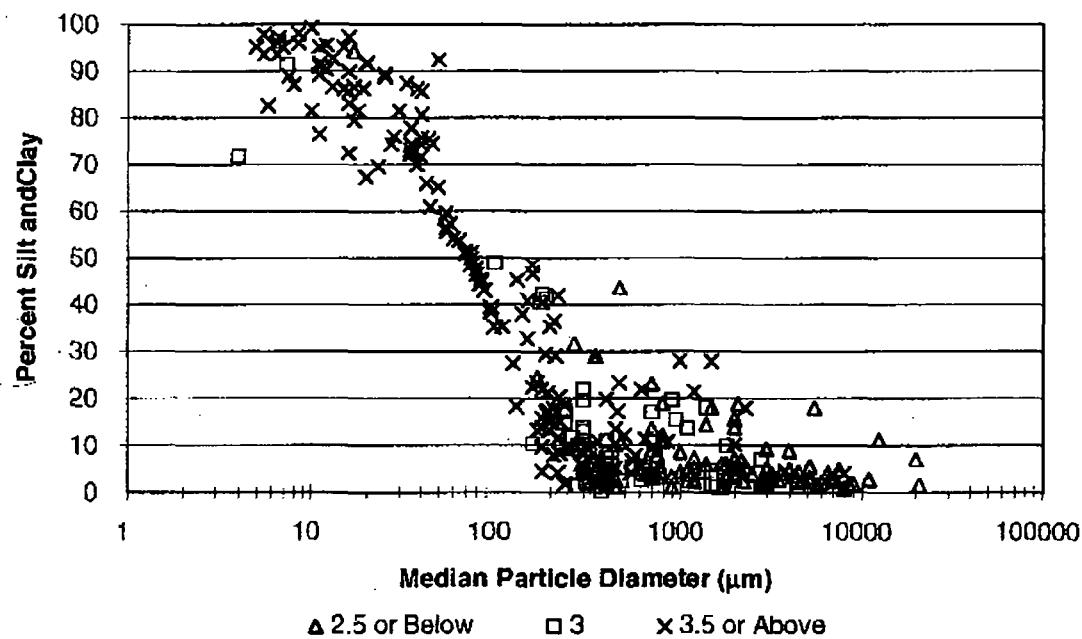


Figure 8. All Cores by New Classification



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